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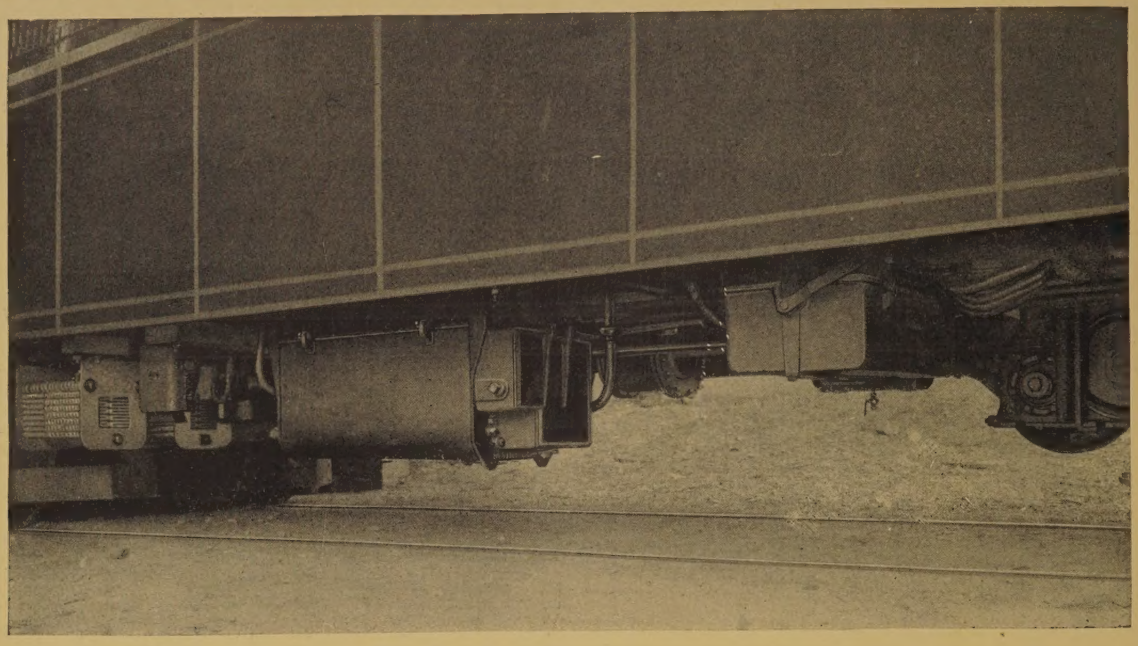

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# Electric Railway Journal

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CONTENTS.

Standardization of Cars..... 271
Congested Corners..... 271
Cast-Iron Bearing Surfaces..... 272
The Self-Propelled Car Here and Abroad..... 272
Signs..... 273
The Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa.... 274
Train Tests in the Cambridge Subway..... 280
Report on Newark Traffic Conditions..... 282
Foreign Convention Report on Self-Propelled Cars..... 283
Methods of Determining the Wages of Employees..... 285
Automatic Block Systems, with Light Signals on Two Interurban Railways..... 286
Decision in the Lincoln High-Tension Case..... 288
Tests of Cross-Arms..... 289
Entertainment Committee of Manufacturers' Association..... 289
Simmen Signal System Officially Approved in Indiana..... 290
Electric Arc Welding..... 290
Sash Lock and Anti-Rattler..... 290
3,000-Kw Vertical, Synchronous-Booster, Commutating-Pole Rotary Converters..... 291
The Milwaukee System for Saturating Journal Box Packing..... 292
Electric Railway Legal Decisions..... 293
News of Electric Railways..... 295
Arbitration of Wages in Springfield and Worcester, Mass..... 295
New Financial Ordinance Proposed in Kansas City..... 295
Transit Affairs in New York..... 295
Financial and Corporate..... 297
Traffic and Transportation..... 300
Personal Mention..... 302
Construction News..... 303
Manufactures and Supplies..... 306

### STANDARDIZATION OF CARS

In these days of rapid progress in car design it seems somewhat inopportune to advocate standards in cars. Of course, any great degree of standardization is impossible. It would be foolish for a company to close its eyes to the possibilities of improvement in the design of any new cars which it is to order, and it would be particularly short-sighted for any company to do so at present, when car design for city service is in a formative state. Nevertheless, there are certain features of standardization which can be adopted, and the benefit to be derived from them would be almost as great as that which followed the elimination of many of the rail sections which were common ten or twenty years ago. Such a plan applied to rolling stock would be, not the standardization of the broad features of car design or even car sizes, but the standardization so far as possible of the details of construction. For instance, if towns A and B find that a car of the same general size and type is most suitable for their work, there seems to be no reason why the cars in use in these towns should differ in detailed dimensions ½ in. here and ¼ in. there, according to the whim of the managers. Nevertheless, it is impossible to visit a shop where cars are being manufactured without having brought to one's observation the seemingly unnecessary divergence in minor details of car design. Radically different conditions of speed and service will account for material differences in types of cars, but there seems to be no real argument which can be advanced for the smaller variations mentioned. Moreover, such conditions make every job special at the factory and of course add to the cost of construction. Even if some slight advantages in the way of car weight or reduction of repairs can be secured, they usually cost more than they are worth.

### CONGESTED CORNERS

Even small cities in this era of high buildings have their problems of congested crossings, and it is rarely that one does not find in a city of 100,000 or 125,000 or more inhabitants some small area or even a single crossing which practically sets the limit to the number of cars which may be run on the principal lines. Many of these cases are susceptible to local treatment, such as greater activity in passing cars through the point of congestion, the cutting out of some unnecessary stops and better police supervision over interfering vehicular traffic. In these efforts, however, sight should not be lost of the general remedy of re-routing. It is our firm belief that this is the remedy for most of the congestion problems in the small cities. It may have been all right years ago, when the traffic was light, to route all of the lines in these cities through the principal business street or around the main square, but to continue to do so indefinitely as the traffic grows is blindly to follow a fetich. We agree that the public, which takes a superficial view of such things and does not analyze the causes, will be opposed at first to any changes in routing. If a man has become accustomed to taking his car at a certain corner he will usually grumble

at first at being obliged to take it at another corner only a block away. But if the change will help materially to improve the service he has no real cause for complaint. By a little judicious planning it will often be found that certain lines of cars can be looped around or pass near the popular corner and accommodate everybody just as well as if every line in the city passed over the same track. This at least is certain, that in the ordinary course of events the remedy of re-routing will have to be applied sooner or later. That is to say, the growth of traffic conditions which produce congestion now will produce more congestion later, and any temporary expedients to reduce the trouble are palliatives only. The remedy is also not without its application in even the larger cities, and among the chief features of most of the reports on traffic conditions made by special investigators during the past few years and printed in this paper have been methods of re-routing by which the cars on the most busy lines do not interfere with each other.

**CAST-IRON BEARING SURFACES**

In our issue of Aug. 17 reference was made to the practice of the Cincinnati Traction Company in placing cast-iron sleeves on armature-shaft journals and their use in plain cast-iron bearings. The satisfactory results obtained from this arrangement, in which the usual wearing surface of steel and bronze was replaced by one of cast iron on cast iron, were unusual and perhaps surprising, yet the high efficiency of cast iron as a wearing surface has been known ever since the infancy of mechanical engineering. A machined surface of gray cast iron rubbing against a similar surface in the presence of a moderate amount of lubricant develops a gloss or polish of great brilliancy and perfect smoothness, probably owing to the polishing and lubricating effect of the graphitic carbon distributed throughout the metal. When this polish has been once produced the coefficient of friction between the two surfaces, as well as the wear upon them, is materially reduced, and the resulting bearing is naturally a very satisfactory one in these respects. The cast-iron bearing has, however, been little used and in fact has remained almost unknown because of its tendency toward what is termed by machinists "galling." When the polished wearing surface is broken at any point on account of heating or the entrance of grit, the broken particles of metal acquire distinctly cohesive qualities so that each piece acts very much like a snowball rolled down hill, gathering additional particles of metal into balls of appreciable size. These naturally score the bearing still further, produce increasing heat, and before long cause the two bearing surfaces to "seize" together and stop the machine. In this respect cast iron is just the reverse of babbitt and bronze, which never "seize" and which can by careful handling be brought back to a good surface even after scoring has commenced. To be successful, a cast-iron-on-cast-iron bearing must be free from anything which might cause heating. Peripheral speeds must be moderate, and if the loading is at all heavy the speed must be low. Grit must at all times be excluded, and a continuous though small flow of lubricant must be maintained. With any metal other than itself cast iron wears badly. It is, in fact, practically impossible to use steel and cast iron together under any circumstances.

## THE SELF-PROPELLED CAR HERE AND ABROAD

A study of the paper read by E. A. Ziffer before the 1912 meeting of the International Street & Interurban Railway Association, as abstracted elsewhere in this issue, discloses some noteworthy difference between American and European practice in the development and exploitation of self-propelled cars. Perhaps the most striking distinction is that so many of the foreign cars have been built for narrow-gage railways. Such lines, except for industrial uses, are almost unknown in this country, but on the Continent the "Kleinbahn," or secondary railway, has always met with favor as a trunk-line feeder from sparsely settled country. In fact, Germany alone had 1351 miles of such railways at the end of the year 1909. The steam car was the first self-contained vehicle to carry passengers, but despite many improvements from time to time, it could not be considered as the final solution, since its superiority to the steam locomotive was chiefly its greater readiness to serve rather than any greater economy and cleanliness. At present the development of gasoline cars abroad seems principally in the direction of the gas-electric car. Large numbers of storage-battery cars are also used in Germany, but it is significant that they have been used almost exclusively as a substitute for steam traction on standard-gage lines emanating from such large cities as Mayence, Königsberg, Breslau, Frankfort, Stettin and Cologne, where energy is obtainable at low prices from large central stations. Thus the Breslau cars are supplied at the very low rate of 1.6 cents per kw-hr. In the following paragraphs some comparisons will be made between typical gas-electric and storage battery cars of European and American manufacture.

There are very few standard-gage gas-electric motor cars in Europe, but Mr. Ziffer quotes a figure of $7,125 for a 14-ton narrow-gage car which seats twenty-nine passengers, an investment of $246 per seat. This compares with a seventy-five-passenger, 40-ton (light) American car which costs about $24,000, or $320 per seated passenger, and with a 100-passenger, 50-ton (light) American car which costs about $260 per seat. The difference in price of the smaller cars is a good indication of the cheaper forms of construction followed abroad, although the actual weight per seated passenger is approximately 1065 lb. for both the European and the smaller American car. In either case it is proper to consider the investment only upon the basis of seated passengers, because a standing load should not be considered for interurban runs. The European car carries 2.8-hp rated engine capacity per ton when fully loaded, and the small and large American cars have 3.6 hp and 2.9 hp respectively. The differences in this respect are evidently due to speeds, as the small car operates at 50 m.p.h. to 60 m.p.h. and the large one at 40 m.p.h. to 50 m.p.h. It is apparent from this that the European car, which is also built for moderately high speeds, is powered as liberally as the American car. In actual service one of the American cars is running 150 miles a day and the European car only 14 miles less. It is an interesting fact that low-grade fuel has been successfully applied on all of these cars, the requirements of a 50-ton American car being estimated at one gallon, at 5½ cents, for 80 to 100 ton miles. Although

the European car is lower in first cost, the American car is at least equal in operating economy so far as can be determined from the meager cost figures published here and abroad. A noteworthy feature of European gas-electric car practice is the wide use of double-end cars. This arrangement has been advocated by steam railroad men in this country, but the makers do not seem to believe that the flexibility thus secured justifies the additional cost and the inadvisability of having the engineer away from his engine for half the time. Train operation, consisting of one gas-electric car and one to three trailers, has been applied successfully both here and abroad. In Belgium a system of distant control has even been developed by which a motorman can operate two gas-electric motor cars, one at each end of a train of five or six cars. As a rule, however, where the traffic requires such trains, we believe that it would be worth while to look well into the possibilities of the overhead trolley or third-rail and the creation of more business by the more frequent headway made possible thereby. At this very writing it is reported that the Arad line in Hungary has enjoyed such a great increase in traffic from the use of gas-electric cars that preparations are being made to change it to a high-tension overhead system. This decision certainly shows that the self-propelled car has not yet reached the point of being the most economical modern means of transportation for all conditions. The operating costs of the gas-electric car are attractive, but none of its makers, so far as we know, has yet followed the battery manufacturers in guaranteeing a maximum rate of depreciation upon the equipment. At present, a figure of 10 per cent is assumed by one maker as conservative for the depreciation of the cars as a whole, but is it conceivable that any combustion engine will give anywhere near the service possible from electric railway motors?

The Prussian and American storage battery cars, both of which are standard gage, show much greater difference in design and conditions of operation than do the gas-electric cars on both sides of the Atlantic. In Europe, as stated, the storage battery cars have been almost without exception designed for suburban steam railroad conditions, and although nearly 200 of them have been placed in operation during the past five years by the Prussian State Railways, little has been done toward the development of a light-weight design equipped with anti-friction bearings. Thus we find that the Prussian articulated cars weigh about 1200 lb. per seated passenger capacity, which is about double the weight of American articulated battery cars for steam railroad conditions. The German cars run at a maximum speed of 37.2 m.p.h., but an American car now in service has already been operated at 39 m.p.h. Hitherto the radius of action of a German car on one charge has been only 62 miles, a limit which has proved inconvenient, so that it has now been decided to provide additional cells to enable the cars to have a range of 80 miles. On the other hand, the American light-battery car at the weight and speed mentioned has a range of 125 to 175 miles on one charge. Owing to the many refinements and the costlier batteries of the American articulated car, its first cost for ninety seated passengers is $22,000, or $244 per passenger. This compares with the crudely built wooden Prussian cars, which cost $20,000 for a 100-seat car, or $200 per passenger. The operating, maintenance and platform expenses of the Prussian cars, plus interest on the investment and amortization charges, are about 32 cents per car mile, or 0.32 cent per seated-passenger mile. This figure gives an excellent basis for figuring the necessary earnings. The Prussian State Railways pay 3.4 cents to 3.5 cents per car mile for battery renewals, a cost which includes supervision of the railway's charging station employees by the battery maker's experts.

## SIGNS

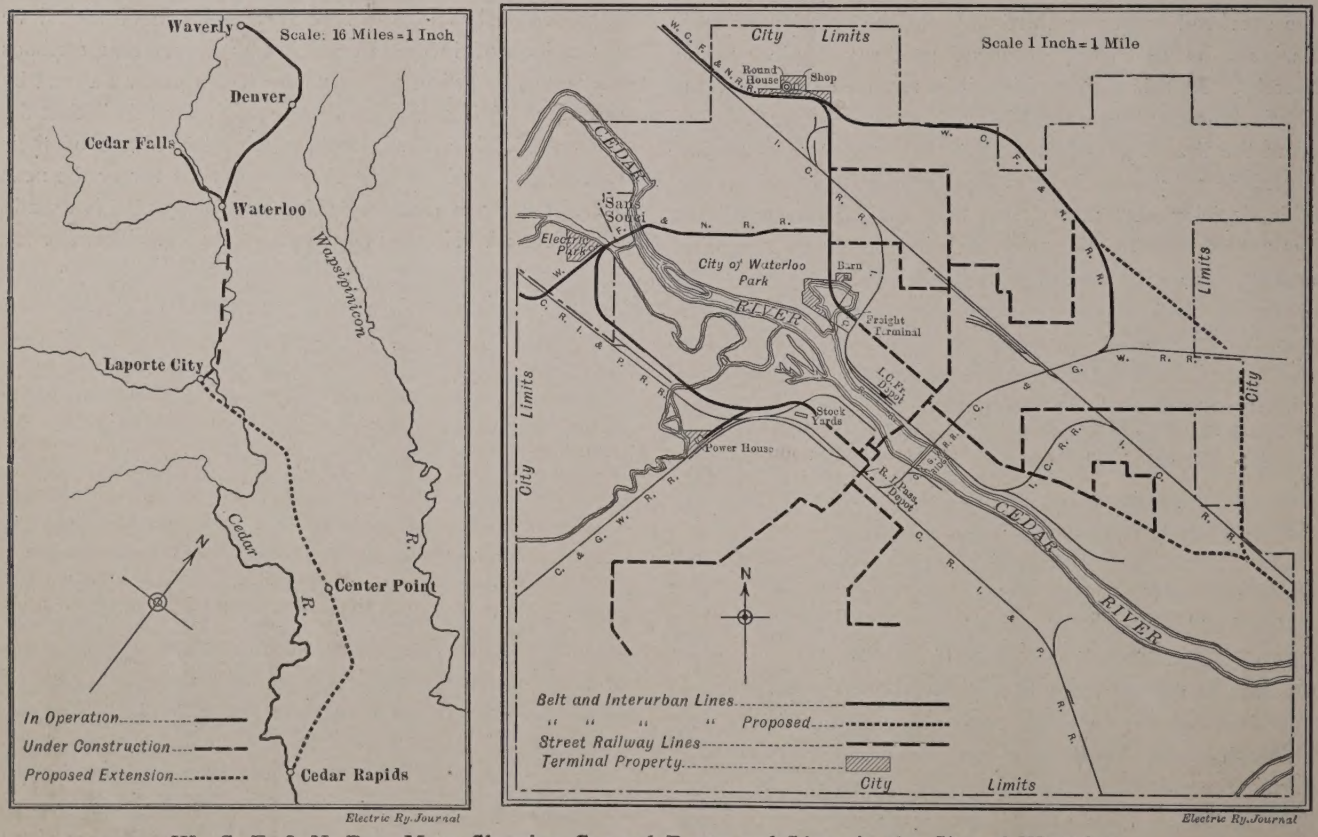
We have before discussed the subject of signs and have expressed our belief that most of the electric railways in the country are deficient in regard to this important matter. It is somewhat remarkable that in America, where advertising is supposed to be a science and the practice of advertising design has almost become an art, there should be such a lack of information about transportation methods and routes, posted in places where it can easily be read by passengers. We assume that the reason for this is that the railway officials are so familiar with the routes of their different cars and whether they stop on the far or the near side of the street that they think everybody else is equally well informed. No doubt habitual riders have little use for signs except for some simple indication of the route. But strangers in the city can hardly be expected to know that a car marked "Main" is the proper car to take for the railroad station which is on Connor Street, or that an elevated or subway train with two red markers and two white markers will make local stops, whereas one with three red markers and one white marker will make only express stops. The only course open to the person who is anxious to learn whether a car or train will take him to a point to which he wishes to go is to mount the steps and have a parley with the conductor, a plan which is apt to delay the traffic and exasperate those who are thus prevented from boarding. A feature of the electric cars in most cities abroad is that they carry signs which give a great deal of information but are not disfiguring, and while the percentage of strangers in the foreign cities may be larger than in this country, we believe that this plan could be copied with advantage here.

But it is not a question of route and destination signs only. We believe that stopping signs are just as important, and that they are becoming more important every day, because of the growing tendency of the railway companies to change from the far-side stop to the near-side stop. It is disconcerting for a stranger in a city, if he is in a hurry to catch a train, to stand on the near-side corner and see a car shoot past him, and it would be equally exasperating if he should stand on the far side and be obliged to risk his neck in a hurried crossing when he saw the car which he expected to take stop 50 ft. or 75 ft. away. We are not prepared to say that every corner should be marked with a sign "Cars stop on this side," but believe that something might be done to relieve the present uncertainty as to the side of the street at which the car will stop. An effort is being made in some cities now to cut out stops at every other block when the blocks are short, and where this is done the stopping point should be marked in some way.

# The Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa

A Feature of the Development of This Property Has Been the Adequate Provisions for Terminals—The Article Also Describes the Track and Equipment Standards

The Waterloo, Cedar Falls & Northern Railway Company, Waterloo, Ia., which owns and operates 31 miles of interurban road out of Waterloo, a belt-line connecting road in Waterloo, a 2-mile interurban, connecting Cedar Falls with the Iowa Teachers' College, and the city street railway lines in Waterloo and Cedar Falls, is a fine example of what may be accomplished in the early acquisition of strategic terminal facilities. Waterloo is a city of about 30,000 population, situated in the heart of a rich farming district. It serves as a jobbing point for groceries, fruits,



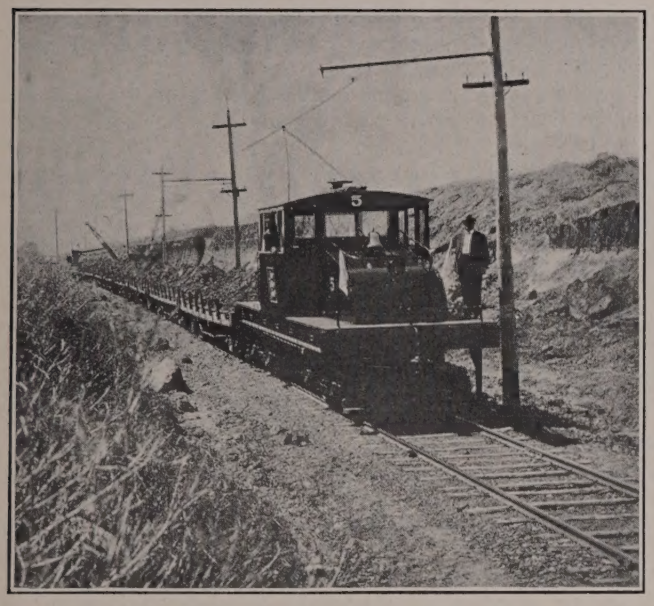

W., C. F. & N. Ry.—Maps Showing General Route and Lines in the City of Waterloo

etc., for the surrounding territory and points west and northwest as far as Omaha, Neb. It is also a large manufacturer and distributer of farming implements of all kinds, and is served by three steam road trunk lines, the Chicago Great Western, the Chicago, Rock Island & Pacific and the Illinois Central. The existing physical conditions and the fact that Waterloo is served by the three large trunk lines have had much to do with the financial success of the Waterloo, Cedar Falls & Northern Railway. The city is divided by the Cedar River, a wide stream requiring expensive bridges to connect what is locally known as "East" and "West" Waterloo. Approximately three-fifths of the total population is on the east side of the river, and the manufacturing and business districts are about equally distributed in both sections. As shown in the accompanying map of Waterloo, the Illinois Central Railroad lies wholly in East Waterloo, the Rock Island Railroad in West Waterloo and the Chicago Great Western Railroad intersects both roads, having built a bridge across the Cedar River, but owing to a lack of proper switching facilities it is unable profitably to handle the transfer business between the two steam roads. Each steam road has a number of manufacturing plants along its line, and there is a constant requirement for interchange of cars between the two roads, as one line serves the south and southeast sections of the United States and the other serves the west and southwest. This lack of proper switching facilities afforded an excellent opportunity for an interchange terminal railroad, which the management of the Waterloo, Cedar Falls & Northern road built. As a result, it now controls practically the entire transfer business in and around Waterloo, which amounts to about 40,000 cars annually.

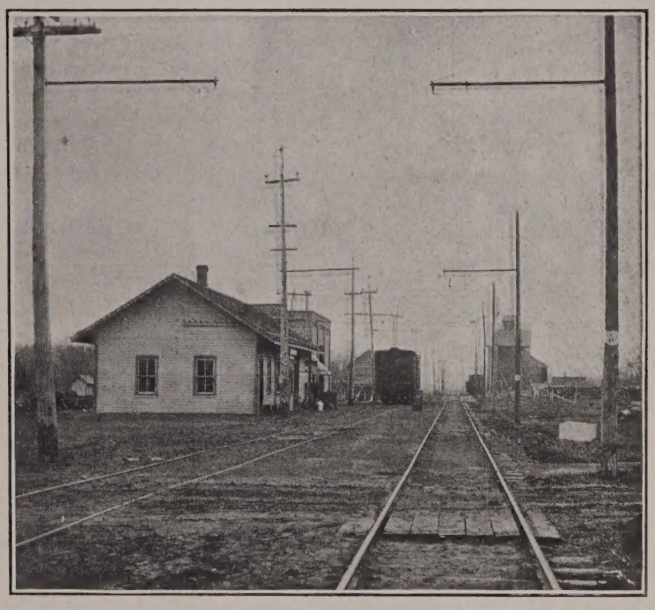
### DEVELOPMENT OF PROPERTY

Before describing the detailed construction and methods of operation of the Waterloo, Cedar Falls & Northern road a brief history of its development will be given. The Waterloo & Cedar Falls Rapid Transit Company, the original organization, was formed by L. S. Cass, J. F. Cass and C. D. Cass in 1895 for the purpose of purchasing the Waterloo Street Railway, which operated a horse-car line about 2 miles in length. The organization of the Rapid Transit company also contemplated the electrification of the street railway line and the construction of an interurban line from Waterloo to Cedar Falls, a city of 8000 population, situated 8 miles northwest of Waterloo on the Cedar River. In 1896 the new company took over the street railway and built four additional miles of track in Waterloo, and in 1897 the line to Cedar Falls was constructed. Being

unable, however, to obtain a franchise over the streets of Cedar Falls, the electric line made a traffic arrangement with the Chicago Great Western Railroad whereby it could run its cars into the city over the tracks of the steam road. At the end of a year and half the city of Cedar Falls repented of its former action and granted the electric line a franchise. At the same time the company purchased the existing Cedar Falls street railway line, operated with Patton motor cars, a type of self-propelled electric car, electrified it and constructed 3 miles of additional track.



W., C. F. & N. Ry.—Work Train on Waverly Line



W., C. F. & N. Ry.—Station at Denver

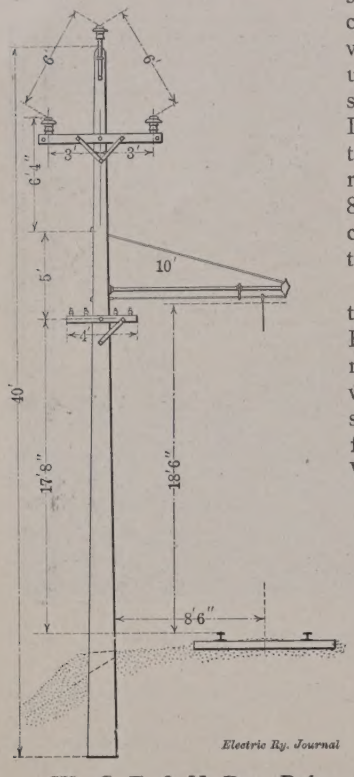
In 1901 an electric line was constructed from Waterloo to Denver, a town of approximately 600 population, situated 14 miles north of Waterloo. About 1903 this line was extended to Denver Junction, where a connection was made to the main line of the Chicago Great Western Railroad from Chicago to Omaha. At this time the Waterloo company entered into a lease with the Great Western for the use of its line from Denver Junction to Waverly, 6 miles west, and also consummated a trackage right agreement covering the Great Western's line between Waverly and Sumner, a 23-mile railroad extending northeast from Waverly. The Waverly-Sumner line was operated by steam from 1905 to 1909, when the Great Western went into the hands of a receiver and the lease was canceled. In 1905 the corporate name of the Waterloo company was changed to Waterloo, Cedar Falls & Northern Railway Company. When the Great Western canceled its lease with the Waterloo company entrance into Waverly was taken away and immediately the construction of a line from Denver Junction to Waverly was financed, and this line was completed Jan. 1, 1911.

While the extensions were being made to the main line of the Waterloo company, a belt line was being constructed from the north to the Great Western on the east side of Waterloo and one from the north to the west and south, where it tapped an embryo manufacturing district in West Waterloo and connected with the Rock Island Railroad. At the present time the belt line to the east is being extended so as to tap another manufacturing district in the southeastern portion of the city, and the first 20-mile section of an interurban road from Waterloo to Cedar Rapids is now under construction. From the map it will be seen that the electric belt lines built and under construction practically surround Waterloo, and the facilities they offer have had much to do with the growth of the city in the past decade, which was in excess of 112 per cent.

W., C. F. & N. Ry.—Track-Switching Facilities at Large Factory

TRACK AND ROADWAY

As was shown, the early history of the road's development was replete with vicissitude, and consequently the first pieces of construction were not up to standard. However, all track and bridges were constructed for a steam road loading and on private right-of-way except in the city streets. Sixty-pound rail on cedar ties, except on curves where hard-wood ties were used, was the first type of standard track construction. In recent track construction, however, the 60-lb. rail has been replaced with 85-lb. A.S.C.E. section with continuous joints and twin-terminal compressed bonds.




W., C. F. & N. Ry.—Pole Construction

The overhead lines between Waterloo and Cedar Falls and Denver are carried on a double pole line with span-wire trolley construction. The extension from Denver northwest to Waverly and the belt lines were constructed to conform to the roadway section standard shown in the illustrations; that is, with a single pole line and mast-arm trolley construction. At this time renewals between Waterloo and Cedar Falls have reached a point where the old No. 00 trolley wire is being replaced with No. 0000 and mast arms are being substituted for span wire. In all renewals the pole butts, gains and cross-arms are being brush-treated with two coats of a high-grade creosote preservative, and the lines have been carefully strained and storm-guyed with ⅜-in. galvanized strand. The poles are spaced at 100-ft. intervals on both straight and tangent track.

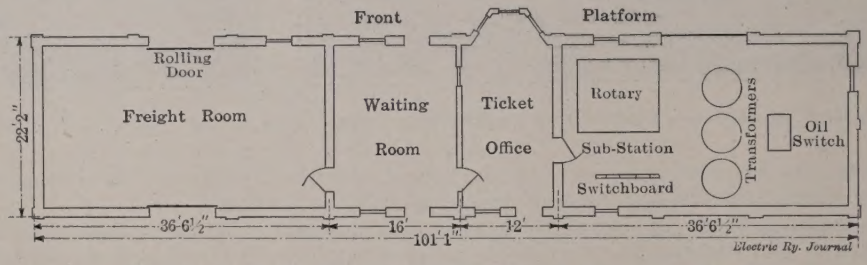
To insure an excess shoulder outside of the toe of the ballast slope, the roadbed has been made full 16 ft. wide, and when slides occur on new high fills, so as to narrow the standard width, additional material is dumped on the sides until a permanent 16-ft. roadbed is obtained. Crushed stone or gravel ballast is not to be had in this territory except by shipment at a prohibitive cost. At first the company resorted to what is commonly known as mud-ballast track construction in some places and sand ballast in others. Both of these are being replaced with cinders from the company's power house, and it is hoped that the new extension to Cedar Rapids will traverse some gravel deposits along the Cedar River where first quality ballast for the old lines and the new extensions may be obtained.

Owing to financial restrictions the bridges on the original lines were of the timber-trestle type, except the bridge across the Cedar River, which is a reinforced highway bridge. In recent renewals and on new extensions the timber construction has been replaced with reinforced concrete arches or steel girders when the span required. A renewal of the Cedar River bridge in the near future contemplates a series of reinforced concrete arches with a double-track roadway. An example of this company's modern double-track reinforced-concrete arch-bridge construction is shown in the illustrations.

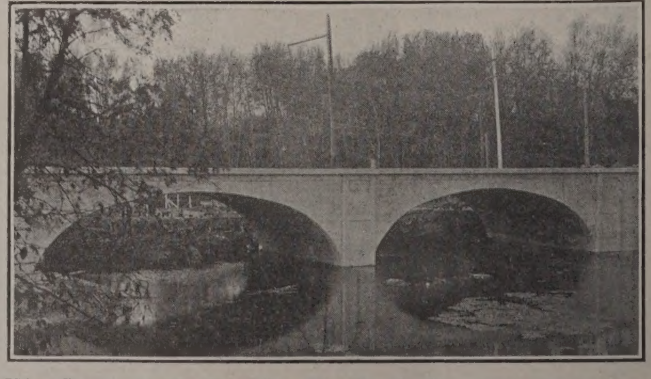
A ruling gradient of 1 per cent has been the established standard on all track construction, and the maximum curvature is 6 deg. except in the city streets at Cedar Falls, Waterloo and Waverly. The private right-of-way varies from 50 ft. to 200 ft. on main-line construction, depending on the grading requirements. The belt lines around Waterloo have been constructed on 100-ft. right-of-way so as to provide ample room for increased track facilities as the freight traffic grows in the future. The private right-of-way is fenced on both sides with a standard stock-proof barb-wire fence carried on cedar posts, except on the new extension from Denver Junction to Waverly, where a combination woven-wire and barb-wire fence supported on American Steel & Wire Company's non-corroding tubular steel posts driven 2½ ft. in the ground was constructed. The special types of these tubular posts have been used in the brace panels, where they were set in concrete.

TERMINALS AND STATIONS

All purchases for terminal and station sites were based on the requirements for future development, and in very few cases did the management let the price of the property required for this purpose alter its decision as to future demands. As a result of this far-sightedness the company now owns its belt lines and a 35-acre tract for freight terminals within six blocks of the wholesale district of Waterloo and on a paved street. Temporary tracks and a freight station have been constructed on this property until future development in freight traffic shall demand an enlarged permanent structure and increased track facilities. The company also owns valuable track facilities in Aladdin,



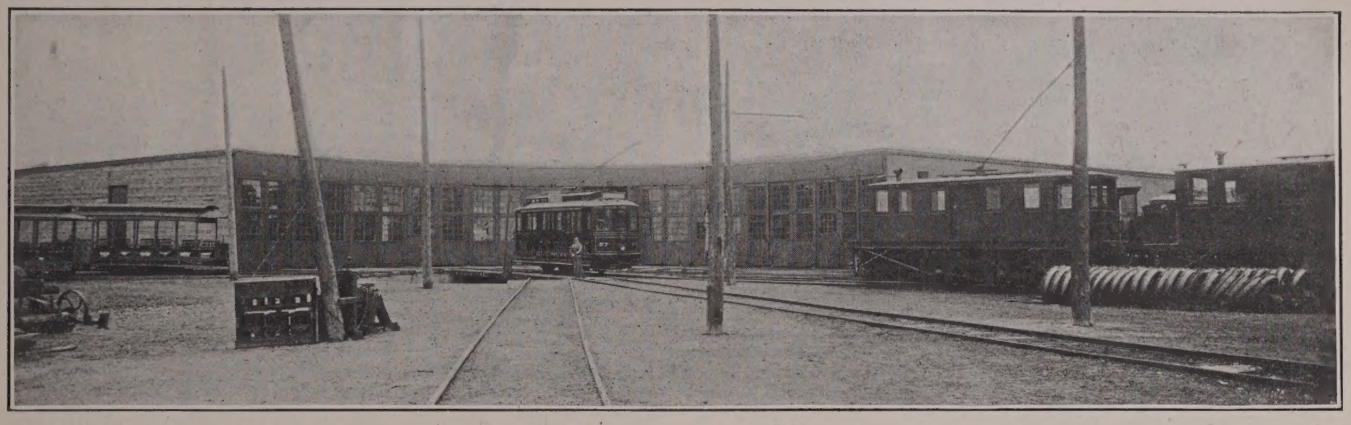

W., C. F. & N. Ry.—Standard Plan of Passenger Station



W., C. F. & N. Ry.—Double-Track Concrete Bridge on Cedar Falls Line

where the Galloway plant, shown on the preceding page, and other large industries are situated and served by the company's belt lines. A tract of land 200 ft. x 500 ft., just outside the business district, serves as the site for the four-bay fireproof carhouse shown in the illustrations, which is 70 ft. x 200 ft. in plan. The design and location of this carhouse on the property is such that three more sections may be added when more storage space is required.

Twenty-three acres of flat farming land just inside the corporate limits of Waterloo constitute the repair-shop property and 13 acres of valuable land, provided with connections to two steam roads, were purchased for a power-station site in Waterloo. In addition to the purchases for shops, freight terminals, etc., the company has provided extra right-of-way at all stations, furnishing ample space for its waiting station, stockyards, coal yards, grain elevators, etc.



W., C. F. & N. Ry.—Roundhouse, Repair Shop and Turntable

To stimulate traffic on the city and interurban lines quite a large tract of land was purchased in the west portion of the city of Waterloo for an electric park. This tract is situated on the Waterloo-Cedar Falls line on a cut-off channel of the Cedar River, and all the attractions common to an electric amusement park have been installed. The park is owned and managed by a subsidiary organization of the railway company and is more than self-supporting. In common with the experience of many other cities of the Middle West it has in fact become a center for the summer amusements of the townspeople.

### POWER TRANSMISSION SYSTEM

The company has recently erected a new power station, which, with the transmission system, will be described in a later article.

### EQUIPMENT

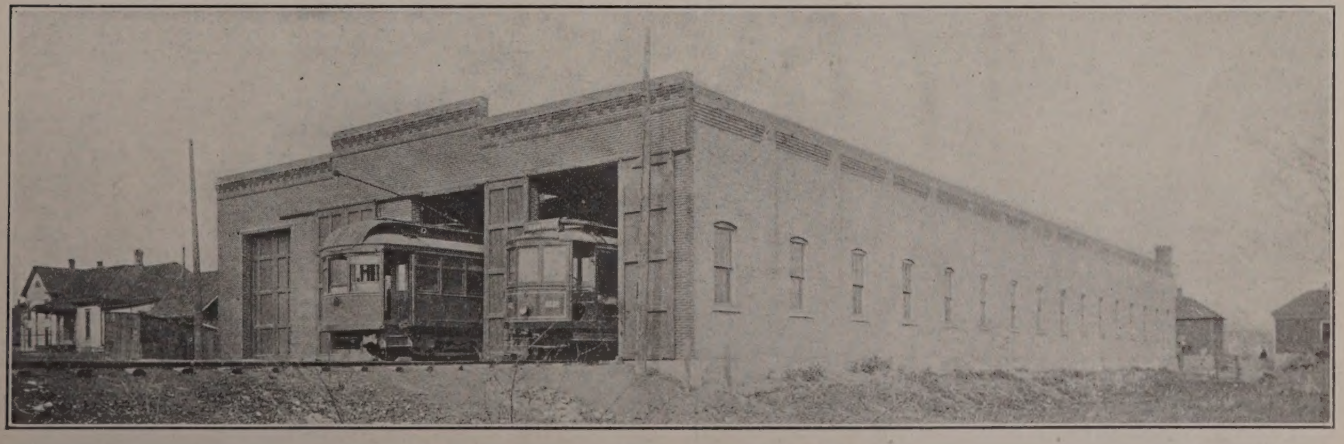
At the present time the rolling-stock equipment, including locomotives and work cars, consists of the following items:

| | |
|---|---|
| Single-truck street cars | 37 |
| Double-truck interurban passenger cars | 10 |
| Package express cars | 4 |
| Electric switch engines | 4 |
| Construction steam locomotives | 3 |
| Single-truck passenger trail cars | 11 |
| Double-truck passenger trail cars | 2 |
| Flat cars | 38 |
| Box cars | 27 |
| Snow sweepers | 3 |
| General utility motor cars | 3 |
| Miscellaneous equipment | 7 |

As will be noted, the number of freight cars is small when compared with the total number of cars handled annually. This is due, however, to the per diem agreements with the steam roads and the fact that a very small amount of the gross freight business is originated and delivered on the company's lines.

Engine No. 5, shown in the illustration, is typical of the type of switching engines used in the interchange and industrial switching service. In general the engine is of all-steel construction with 9-ft. x 30-ft. over-all underframe dimensions. The cab equipment is arranged for double-end operation. The engine is equipped with extra-heavy Taylor trucks designed for 33-in. wheels and four GE-73 motors, giving 106 hp at 650 volts with a 17:73 gear ratio. The motor control is furnished through a GE type-M control equipment, and the engine is provided with automatic air brakes. This engine was designed and built by the Waterloo company.

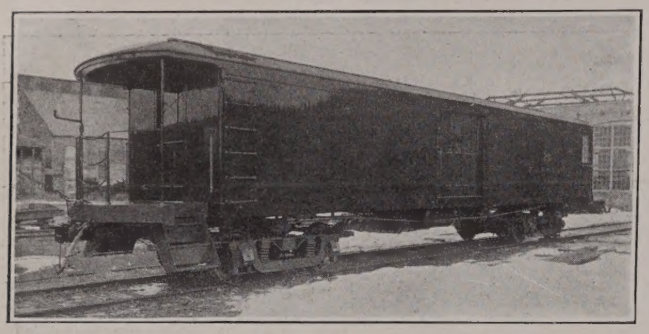
The standard package express car shown in the illustration was designed for handling the local package express business and also delivers foreign freight cars to and from points on the company's lines outside of Waterloo. Essentially this car includes an all-steel underframe 50 ft. over the bumpers by 8 ft. 8 in. in width. The body was designed for single-end operation with a motorman's cab in one end and a 4-ft. back platform, which greatly facilitates switching and reduces the hazard to trainmen boarding the car when in motion.



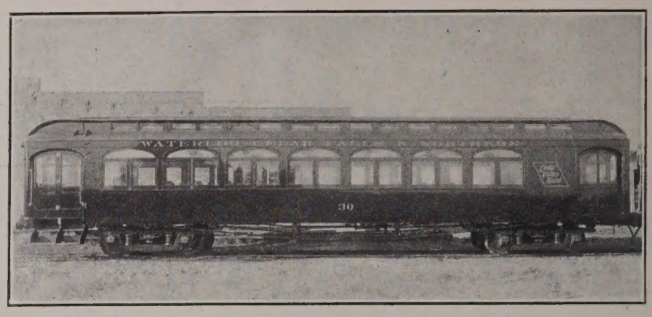
W., C. F. & N. Ry.—Carhouse at Waterloo

The standard passenger car for interurban service was designed with a view of obtaining a maximum seating capacity and reducing to a minimum the time required to load and unload a single-end car. Seats are provided in the passenger compartment for fifty-six passengers, and the back platform has been made 7 ft. long so that two 2-ft.

3-in. swinging doors with a stanchion between them could be installed. This extra width permits two passengers to board or alight from the car at the same time. The baggage compartment also furnishes space for the heater and the motorman. In general the car body is 57 ft. 6¾ in.



W., C. F. & N. Ry.—Standard Express Motor Car



W., C. F. & N. Ry.—Standard Interurban Car

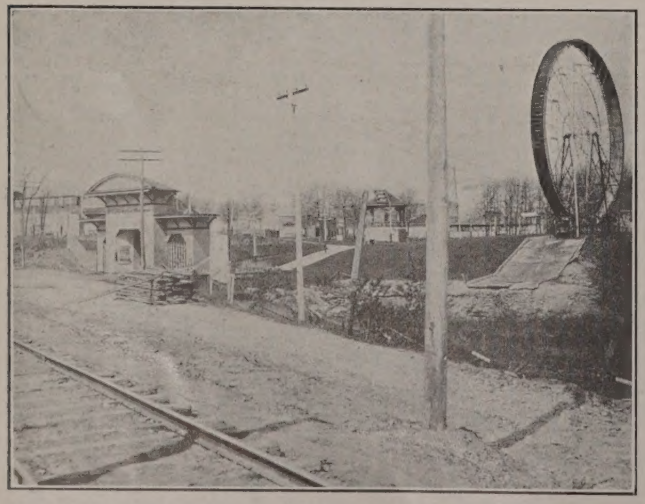
over bumpers with an 8-ft. 3-in. clear inside width. The electrical equipment includes four GE-87 motors with the same company's type-M control. All freight and passenger rolling stock is equipped with M. C. B. standard drawbars and Westinghouse automatic air brakes. The standard package express and passenger cars were designed and built by the McGuire-Cummings Manufacturing Company.

REPAIR WORK

All general repairs to equipment are handled at the company's repair shop situated in the suburbs of Waterloo. The repair-shop building is in the form of a twelve-stall roundhouse. The transferring to the different departments of the shop is done by a 55-ft. motor-driven turntable which is approached from the shop yard tracks by a single lead. The shop building is 72 ft. deep and built on a 130-ft. outside radius. The shop has been arranged in three separate departments, one for blacksmith work, the truck shop and the machine and wood shop. A general storeroom in another building adjoins the machine and truck shops and the armature repair shop is in a separate building adjoining the machine shop.

OPERATION OF STREET RAILWAY AND INTERURBAN LINES

A dispatcher's office, situated at the junction of the lines to Cedar Falls and Waverly in Waterloo, dispatches the



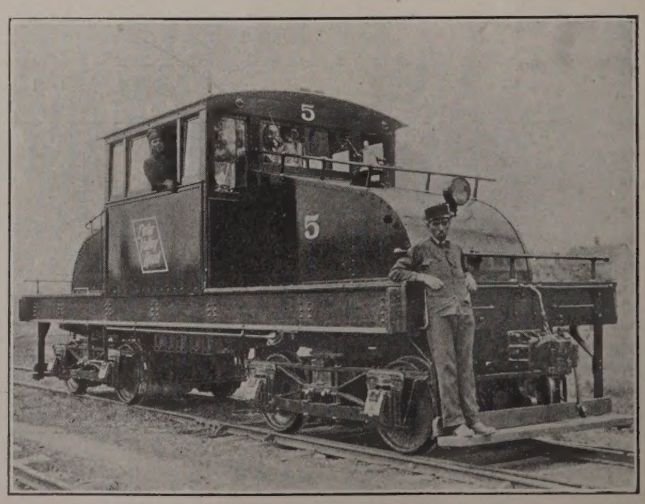
W., C. F. & N. Ry.—Electric Park

two divisions of the interurban system and will also take care of the extension to Laporte City when it is completed. Dispatching methods include both telephone and telegraph. The latter is employed primarily in sending and receiving messages from the steam road interchange stations and is supplied with energy from the feeder circuit through a bank of lamps. Besides the telephone and telegraph instruments located in the dispatcher's office a line-control switch and recording voltmeter have been installed. A standard telephone set inclosed in a cabinet mounted on a pole at the switchpoint has been installed at all sidings and the switch lamps are lighted electrically. Whenever the siding is near an important stop four of the lamps are mounted at the crossing and the fifth lamp in the series is installed in the switch lamp.

A six-minute service is furnished on most of the city lines, which require fifteen cars in regular service. The service from Waterloo to Cedar Falls includes twenty-two round trips in eighteen hours and that from Waterloo to Waverly seven round trips in eighteen hours. One limited car run is made to Cedar Falls at 6:05 o'clock in the evening, making the 8-mile trip in twenty-three minutes without a stop. The regular running time between Waterloo and Cedar Falls is twenty-nine minutes, and the trip to Waverly, which is 23 miles, requires one hour for regular running time. In addition to the passenger service two package express car round trips are made over both divisions, which handle the local freight business. All trainmen come under the supervision of a trainmaster and his assistant, who report to the superintendent. The chief dispatcher and his assistants report to the superintendent and are responsible for the dispatching of trains.

TRAFFIC

The Waterloo, Cedar Falls & Northern Railway, although a comparatively short road, has as complete a traffic or-




W., C. F. & N. Ry.—Electric Switching Locomotive

ganization as will be found on any electric road in the country. The traffic department organization is shown on the chart in the illustrations. The amount of interchange business handled at Waterloo requires quite a complete organization in itself due to the large number of cars it is necessary to bill to distant points. All traffic department

forms conform to the standards employed by the American Railway Accountants' Association. Interchange contracts have been made with all the steam roads touched by the interurban line, which brings this short road within the jurisdiction of the Interstate Commerce Commission.

The total carload business amounts to 40,000 cars annually, of which 7000 originate on the company's lines. The belt lines around Waterloo touch practically all the important manufacturing plants. A number of large industries are served exclusively by the electric railway, having located their plants in the outskirts of the city where they are furnished with street railway service as well as switching service to all the steam roads.

Of the freight traffic originating within the company's zone, a large portion is confined to stock shipments which average about 1000 cars annually. Two carloads of butter are shipped each week from Waverly to the New York market, and revenue from the grain elevators situated along the line forms quite a large proportion of the gross earnings from the company's industries.

In addition to the earnings from passenger and freight traffic the Wells Fargo Express Company has contracted for the local express business and uses the electric line to transfer express from the branch lines of the Chicago Great Western at Waterloo to the main line at Waverly. East and west passengers for Waterloo also are received from the Great Western at Waverly where the electric line passes the steam road station.

A statement of the gross revenue for the year ended March 31, 1912, and the cost of operation, which is below 50 per cent, is as follows:

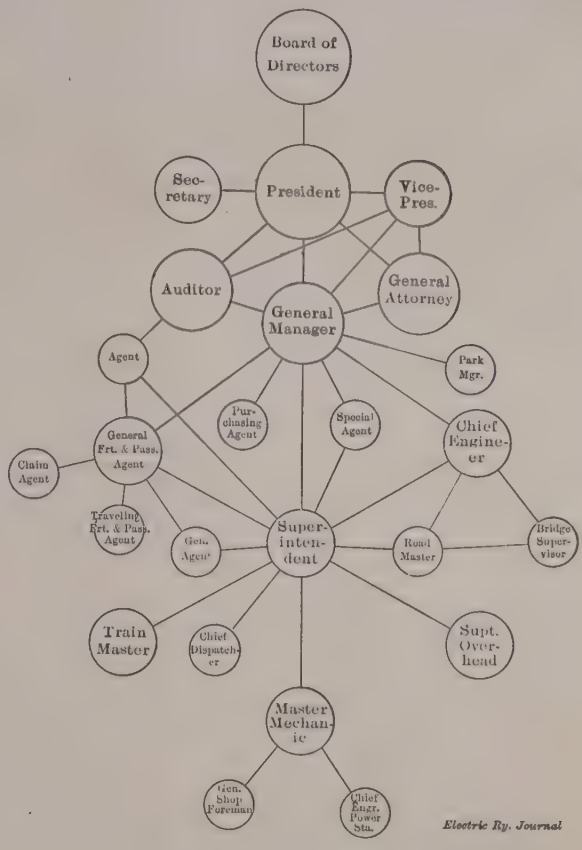
| | |
|---|---|
| Gross earnings | $329,379.57 |
| Operating expenses and taxes | 162,570.66 |
| Net earnings | $166,808.91 |

The passenger earnings per car mile for city lines and interurban lines are distributed as follows:

| | | |
|---|---|---|
| Cedar Falls local lines, 5 miles | 20 | cents per car mile |
| Waterloo local lines, 25 miles | 23½ | cents per car mile |
| Cedar Falls Interurban, 8 miles | 46 | cents per car mile |
| Waverly, 23 miles | 33 | cents per car mile |

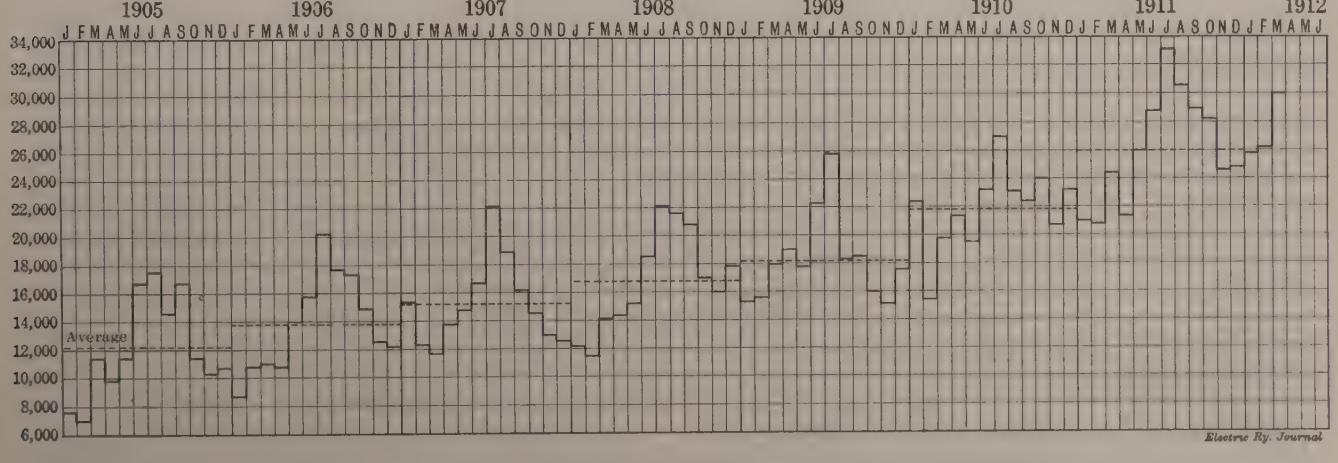
The freight earnings amount to about 40 per cent of the gross income.

The fact that the factories are located in the outlying districts of Waterloo has much to do with the rate of return from passenger business. Waterloo has a number of small parks situated in different parts of the city, all of which are touched by the city lines. A large Chautauqua Park is also touched by the company's interurban and street railway lines in the western part of East Waterloo. This park is situated on the bank of the Cedar River, which furnishes fine fishing and boating as forms of amusement. Although the Chautauqua proper lasts only three weeks, quite a large number of permanent cottages have been built on the park grounds which serve as summer homes during four to six months of each year. Just across the Cedar River from the Chautauqua Park is the railway company's electric park and also Sans Souci Park, where a summer hotel is located, and this also serves to stimulate traffic on this section of the line.




**W., C. F. & N. Ry.—Organization Chart**

As will be noted in the monthly earnings chart, the gross earnings per month have shown a continual increase since 1905, but the results of the construction expenditures are just beginning to show their proportion of the net increase. The gross earnings for the fiscal year ending March 31, 1912, show an increase of 40 per cent over the corresponding period in 1910, and the present gross increase per month shows a net gain in excess of 30 per cent over the corresponding months of last year. As shown, July has invariably been the busiest month.


1905
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24,000
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14,000
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Average
Electric Ry. Journal

**W., C. F. & N. Ry.—Chart of Gross Earnings in Dollars Per Month**

# Train Tests in the Cambridge Subway

Methods and Results of an Extended Analysis of the Electrical Characteristics of the Newest Underground Rapid Transit Line in Greater Boston

Through the courtesy of Dr. Harold Pender, of the electrical engineering department of the Massachusetts Institute of Technology, a résumé is given in the following pages of an exhaustive test recently conducted under his direction by H. M. Foley, J. C. Freeman, P. E. Golsan, H. D. Kemp and T. B. Lawler, of the class of 1912, upon the multiple-unit trains of the Cambridge subway of the Boston Elevated Railway Company. The object of the investigation was to obtain reliable data upon the running times, speeds, energy consumption, acceleration, braking, current demand, temperature rise in motors and train resistance in connection with the operation of rolling stock in the new $11,000,000 subway connecting Park Street, Boston, with Kendall, Central and Harvard Squares, Cambridge. The care with which the work was planned and executed resulted in an accuracy of data well within 5 per cent maximum error, and it is believed that the material presented below constitutes a valuable addition to the literature of electrical train operation on rapid transit lines of high character.

### SUBWAY EQUIPMENT

A brief summary of the principal engineering features of the Cambridge subway is given below, the line having already been described in detail in this journal. The line as at present operated is but a portion of a subway to be completed in the near future between Harvard Square, Cambridge, and Andrew Square, Dorchester. The section now in operation is about 3 miles long and includes stations at Kendall, Central and Harvard Squares and at Park Street. It is equipped with a double-tracked, rock-ballasted roadbed, multiple-unit trains operated on the direct-current, third-rail, 600-volt system, automatic block signals and large station platform accommodations. By its use the running time between Harvard Square and Park Street has been cut from seventeen minutes to eight minutes each way. Steel cars built with six doors each, ramps and escalators at the station in Boston are features of interest, and the present electrical supply is derived from the alternating and direct-current generating plants of the railway company. Forty steel cars are in service. They were described in the issue of the Electric Railway Journal of Jan. 6, 1912. The other operating features of the subway were made the subject of an article which appeared in the issue of May 11, 1912.

### TESTING APPARATUS

In making the tests a recording table was installed, following the general idea of the test table designed by the Boston Elevated Railway in 1904 for work in elevated and subway train studies. The design of the table used then was fully described in this journal at the time. In general, the readings of speed, voltage on the line and on motors, etc., were obtained from calibrated instruments, the records being secured by the method of following the instrument pointers with a mechanical handle and pointer attached to ink-recording pens by a light wire and pulley system. The paper upon which records were made was driven electrically through a magnetically operated pawl and ratchet movement controlled by a clock escapement. A recording ammeter of special design for railway work was employed, the sheet upon which current-time curves were drawn being driven by a small motor at the rate of 6 in. per minute, a rate about sixty times as fast as that of the ordinary curve-drawing ammeter. The measuring element of the ammeter was of the dynamometer type, and as the torque was high to overcome pen friction, a special damping arrangement was used, consisting of a copper sector acted upon by a powerful electromagnet which was excited from a set of five storage cells. The pen furnished was of special construction in order that a definite mark might be made even for the most rapid current fluctuations. The ink was drawn by capillary attraction from a small reservoir through a small brass tube about 3 in. long. As the hole through the tube was very small, a continuous fine line was obtained for rapid movement of the pen. In order to mark off definite and accurate time intervals on the charts when run at different speeds, the time marker clock was arranged to close a relay circuit every 5 seconds. The relay operated a solenoid in the recording ammeter which carried a pen, and when the circuit was closed by the clock, the pen was drawn across the chart, marking off these intervals of time. The test table was placed transversely across the car, in order to avoid the effects of acceleration and deceleration upon the instrument's moving parts.

### ORGANIZATION OF TESTS

The regular run tests were made as nearly as possible under service conditions, a three-car train being used. The station stops were made twenty seconds in each test, representing a fair average of service conditions. Each car in the test train was in good working order and represented a fair average of the forty cars used in the subway. These cars were the first completed and had been run many miles before the tests were made. During the runs one man instructed the motorman about stopping and starting the train, another took the time of stops and starts and any unusual conditions noted in the trip, while several were stationed at the table, one at each of the instruments measuring line potential, voltage on motors, and speed. One man took charge of the paper-driving mechanism and another attended to the clock, the two latter also looking after a mercury contact cup used in connection with the clock escapement and paper-driving magnet system and keeping watch of the pens. One man attended to the graphic ammeter and time-marker, keeping the exciting current constant and starting and stopping the two mechanisms as required. Another man assisted in calibrating the graphic ammeter before each run. This was done by throwing the controller to the first notch while the brakes remained set. The current was then measured by the fall of potential observed through a shunt of known value, and by this means the graphic instrument was made to read exactly 300 amp for half-scale deflection. The voltmeters were checked by the potentiometer method and found accurate. Speed was measured by the calibration of a magneto driven by belt from a pulley of the split type mounted on the car axle. The instrument was calibrated by placing the pulley on a shaft in the laboratory. The readings on the voltmeter corresponding to a measured number of revolutions of the shaft were found. From the diameter of the pulley and the car wheel a constant was determined which gave the speed in miles per hour corresponding to any given voltage reading. As a check on this, markers were placed at known distances apart on level track and the number of revolutions noted in the stated distance, the constant being again computed. The magneto was placed upon the trailer truck and rigidly attached to it by strips of iron bent into loops shaped like the truck frame. These strips were driven on, thus giving a firm attachment without the use of bolts in the frame. These pieces of iron were bolted to a small board upon which the magneto generator, cushioned by a piece of felt, was also bolted. By crossing the belt a good arc of contact was obtained with little slip. The runs were attended by representatives of both the Boston

Elevated Railway Company and the Westinghouse Electric & Manufacturing Company, although the responsibility for the data obtained was assumed by the Institute of Technology.

A summary of the results obtained by the tests is given in the following table:

SUMMARY OF RESULTS.

| Regular Runs. | East. | West. | Average. |
|---|---|---|---|
| 1. Time train in actual motion | 400 | 390 | 395 secs. |
| 2. Time train used power | 285 | 271 | 278 secs. |
| 3. Average speed running | 28.4 | 28.9 | 28.7 m.p.h. |
| 4. Maximum speed | 44.0 | 44.6 | ... m.p.h. |
| 5. Rate of acceleration | 1.73 | 1.84 | 1.78 m.p.h.p.s. |
| 6. Rate of braking (service) | 1.65 | 1.46 | 1.55 m.p.h.p.s. |
| 7. Average current per motor | 97 | 117 | 107 amps. |
| 8. Root-mean-square current per motor. | 133 | 153 | 143 amps. |
| 9. Average line voltage (power on) | 576 | 566 | 571 volts. |
| 10. Average motor voltage | 394 | 382 | 388 volts. |
| 11. Kw-hr. per train mile | 11.10 | 12.95 | 12.02 |
| 12. Watt-hr. per ton-mile | 85.40 | 99.50 | 92.40 |
| 13. Rise in temperature for 13-hr. run— | | | |
| Armature | | | 64.5 deg. C. |
| Commutator | | | 75.2 " " |
| Series field | | | 46.3 " " |
| Interpole | | | 51.6 " " |
| Frame | | | 36.5 " " |

SPECIAL RUNS.

1. Rate of braking (emergency), 2.5 m.p.h.p.s.
2. Distance for emergency stop (see Fig. 3).
3. Train resistance (see Fig. 1).
4. Maximum inrush current per car, starting on 3 per cent grade, 1080 amp.

## DISCUSSION OF RESULTS

The average speed or running time for a given equipment depends upon the contour, train resistance, time of coasting, voltage, etc. Speed-time curves may be constructed theoretically but at best serve only in the selection of the equipment. The chief difficulty in their use arises from the absence of accurate knowledge of their various constants and from the "personal equation" of the motorman. To obtain the most practical speed-time curve it is necessary to take one directly from a train by special apparatus. Such curves for the Cambridge subway are shown, together with the current-time, voltage-time and kilowatt-time curves for a complete service round trip, and they show the usual effects of grade, curvature, etc., found in any speed-time curve. They are of particular interest in showing the marked effect of air resistance in a closed tube, as indicated by the decrease in train speed as the Beacon Hill tunnel is entered. The current, voltage and power curves are such as are usually found in a high-speed system.

The current curves show the cycle through which the

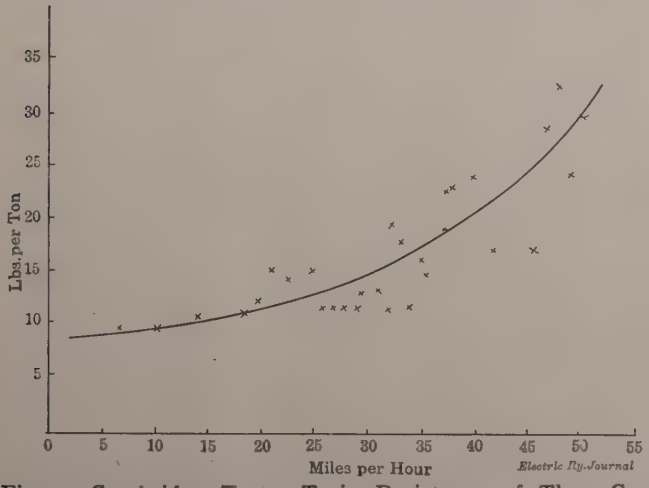



**Fig. 1—Cambridge Tests—Train Resistance of Three-Car Train in Subway**

current passes during each run. A knowledge of these curves permits the computation of the root-mean-square current whereby the selection of equipment may be checked. This current was found in the Cambridge subway to be well within the allowable continuous-current rating of the motors, which is 150 amp at 300 volts or 130 amp at 400 volts. The motors are thus permitted to run at a maximum temperature well within the specified limits. The values of line and motor voltage could have been approximately computed on the basis of past experience, but in the interest of greater accuracy these data were included on the performance sheet. The input per train mile and per ton mile are directly affected by the grades and also show the effects of the large windage in the tunnels. A glance at the values between individual stations shows how the energy consumption may vary from a small amount on down grades to a large amount when the equivalent grade is upward. Acceleration was adjusted at the throttle or limit switch of the car-wiring circuit to obtain a rate of about 1.5 m.p.h.p.s. maximum.

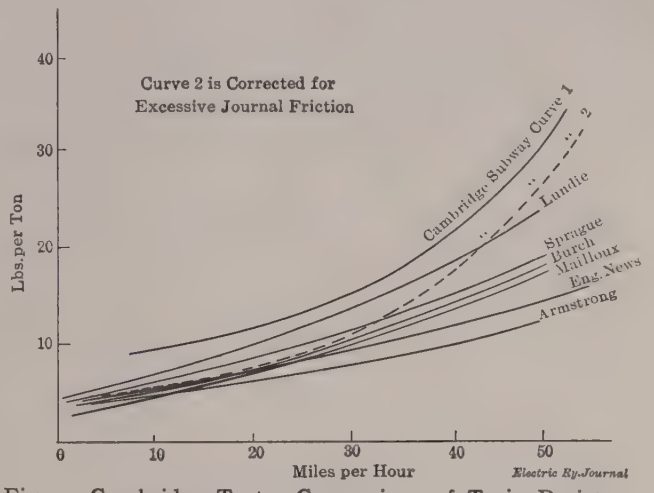



**Fig. 2—Cambridge Tests—Comparison of Train Resistance Curves**

### TRAIN RESISTANCE

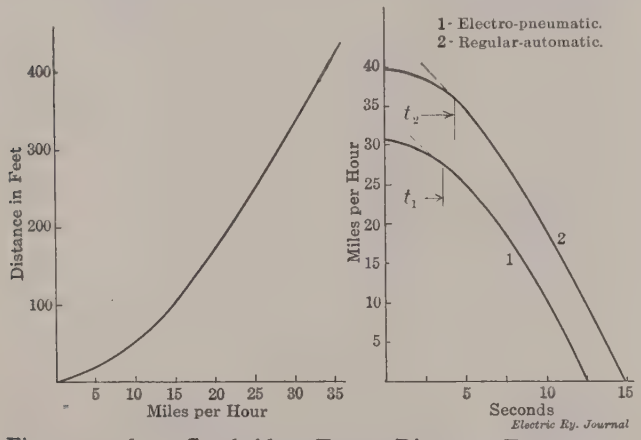
The train resistance in this system involves a factor which appears as yet to have been but little studied, viz., the effect of closed tubes on windage conditions. It is generally conceded that train resistance is a function of windage, speed, track and bearing conditions. The windage in turn being dependent upon the size and shape of the car, it appears that exterior conditions in which the car is operated have an important influence upon the results. The air currents in a closed tube differ materially from those in the open, the size and shape of the tube having a marked effect. For the sake of comparisons, six of the well-known train resistance formulas have been plotted in Fig. 2. When Curve 1, Fig. 2, was taken the trains in the subway were new and had excessive bearing friction due to the journal brasses which had just been babbitted. This extra friction was corrected for by drawing Curve 2, having 4.5 lb. per ton less friction at each point. This was justified by the fact that the new curve coincides with the ordinary curves at 10 m.p.h., the tunnel windage being negligible at that point. It was not necessary to correct for track resistance as the roadbed was in good condition and had been worn smooth. Curve 2 shows the marked effect of windage at high speeds. At 50 m.p.h., for example, the resistance is 7 or 8 lb. above the values obtained by the Sprague, Burch and Mailloux formulas. The curve has value in connection with the selection of motor equipments for the propulsion of trains through subways and closed tubes.

### BRAKING

The type of brake used on the subway trains, Westinghouse ALME, is in operation upon but a few railways in this country, and up to the present time few or no experimental data have been obtained from it. A comparison of the actual speed-time curves in emergency applications of the type AM automatic and the ALME electropneumatic equipments is shown in Fig. 4. Curve 1 is a speed-time diagram taken from the Cambridge subway tests and Curve 2 from Renshaw's pamphlet on tests upon cars of the In-

diana Union Traction Company. Both represent emergency stops at an average retardation of about 2.5 m.p.h.p.s.

The basis of the comparison is the lapse of time between the application and the full brake-cylinder pressure, values being estimated from the curves as the time between application and the point where the full retarding rate is reached. This latter point is determined by drawing tangents to the curves. It is evident that for the above operation a time of 4.5 seconds is required with the AM type, while only 3.8 seconds is required with the ALME. It appears therefore that 0.7 second is required for a pneumatic impulse to travel through the piping of a single car from the motorman's handle to the triple valve, and it is also reasonable to assume that for $n$ cars 0.7 $n$ second will




**Figs. 3 and 4—Cambridge Tests—Distance Traversed in Emergency Stops, and Comparison of Regular Automatic and Electropneumatic Braking Systems**

be required. No such loss of time occurs with the type ALME equipment, the triple valves of all cars being simultaneously set into operation by solenoids controlled from the motorman's handle. The length of time required to lower the train-line pressure enough to actuate the triple valves of the rear cars of a long train under the old system becomes excessive and demands the use of the electropneumatic type for rapid transit work.

TEMPERATURES

It is evident from the results of the temperature tests that at no time does any part of a motor exceed its allowable temperature rise. Inasmuch as these tests were made upon three trains between 7 p. m. and 9 p. m., immediately after the rush hours, and after having been in service for thirteen hours, the values here given represent the maximum heating during regular service. The uniformity of the results obtained on twelve motors warrants the adoption of these values as indicative of the characteristics of the motor equipment of the Cambridge subway trains as a whole.

## CONVENTION OF NATIONAL ASSOCIATION FOR TESTING MATERIALS

The convention of the International Association for Testing Materials will be held at 29 West Thirty-ninth Street, New York, Sept. 2-7. Admission will be limited to members of the International Association and of the American society which is affiliated with it, and to duly appointed delegates from foreign countries and scientific bodies. There are about 170 foreign papers and about thirty-five American papers in the list. The proceedings of the congress will be conducted in English, German and French, with the aid of interpreters. Germany will send nineteen delegates, including representatives from national and municipal departments. Great Britain will have twenty-five delegates and Russia the same number. Among the papers by Americans are four on the subject of rail manufacture.

## REPORT ON NEWARK TRAFFIC CONDITIONS

A report on the traffic congestion at the corner of Broad and Market Streets, Newark, N. J., has recently been prepared for the City Planning Commission of Newark by F. Van Z. Lane, formerly assistant engineer in charge of traffic, Department of Bridges, city of New York, and at present in the same position for the Department of Public Works, Manhattan. Mr. Lane finds that during the most congested period of the evening rush hours a rate of 180 cars an hour at a speed of 3.9 m.p.h. is maintained westbound on Market Street, Newark. He believes that a larger number of cars can be sent across the crossing during the rush hours by changes in the conditions of loading, by the improvement of police supervision over vehicular traffic at the crossing and by other methods described in the report. As an instance of possibilities in these directions he says that on Broadway, New York, 168 cars pass a given point at a speed of 6.27 m.p.h., and on Fulton Street, Brooklyn, 256 cars move east-bound at 3.68 m.p.h.

To increase the capacity Mr. Lane believes that cars on Market Street should approach Broad Street in groups and should load and unload in groups, and that the public should be taught to accustom itself to these conditions. To stop on each side of the crossing to take and discharge passengers delays the service. Observations were also conducted on the number and direction of the vehicles which use the crossing, and of these 74 per cent made direct crossings, 17 per cent made right-angle turns to the right and 9 per cent made right-angle turns to the left. The report recommends that these last be prohibited and that these vehicles be made to use other streets. When the cars cross the streets they should be operated as closely together as safety will permit. When they receive the signal to move all loading should be stopped at once regardless of whether passengers are waiting to board the cars. The projecting fenders should be folded back against the dashboard to economize space on the street, and it might be desirable even to run two-car trains.

Observations also show that of the standing vehicles near the corner many were not close to the curb. The report recommends that vehicles should be prohibited from standing at curbs on all the busy streets unless actually engaged in loading or unloading, and even this process should be stopped during very congested periods. These points can very readily be covered by an ordinance, and then the trouble can be removed by the police.

Finally, the report recommends re-routing several of the lines. Two lines are now required by their franchises to run to the Market Street station of the Pennsylvania Railroad, which, since the opening of the Hudson tubes, is no longer the center of traffic that it was. Conditions of routing should be changed to suit the business conditions. Certain other lines might also be re-routed so as to reduce the number of lines operated on Market Street. The report congratulates the city on the quality, the quantity and the cheapness of its street railway service and states that by the co-operation of the public along the lines mentioned the company can better serve the majority of the people.

The report advises the passage of traffic ordinances to cover the improvements proposed.

The highways committee of the London County Council has made arrangements for the publication for distribution, free of charge to the public, of a route map of the London County Council's tramways. To render this map of the greatest use to the traveling public, it recommends that each route thereon should be indicated by a separate number, and that the number should be displayed on all cars operating that route. The number of cars to be so equipped is 1685, and the cost of affixing two number signs to each car and providing a number of spare plates is estimated at £1,754.

# Foreign Convention Report on Self-Propelled Cars

**Data Are Given on the Operation of Gas-Electric Narrow-Gage and Storage Battery Standard-Gage Cars**

At the seventeenth congress of the International Street & Interurban Railway Association, held at Christiania, Norway, July 2-5, 1912, E. A. Ziffer, president Bukowina Railways, Austria, presented a report on self-propelled cars in continuation of his treatment of this subject at previous conventions of the association.

### STEAM CARS

The first part of the report deals with steam-operated cars. In Germany during 1910 sixteen standard-gage, vertical-boiler cars ran 365,420 miles at a cost of 1.7 cents per mile for fuel, 0.11 cent for lubrication and 0.97 cent for maintenance; total 2.78 cents per car mile. The first of these cars was placed in service in 1904. The principal advantages of steam motor cars, compared with steam locomotives, were lower labor cost, as they permitted one-man operation, lower maintenance cost and a greater readiness to serve, which in turn made possible more frequent service. Some of the types of steam cars have not shown any economy compared with the steam locomotives. Thus, one Austrian railway found that the platform and operating cost of Komarek steam cars was 14.4 cents per car mile, whereas the steam locomotive cost was 11.52 cents per car mile.

### GAS-ELECTRIC CARS IN GERMANY

The second part of the report deals with various forms of gas-electric cars. The Prussian-Hessian State Railways began the use of such cars in 1907. In the later types used by these lines the engine and electrical equipment are mounted on a truck which extends about 8 ft. in front of the car body so that no vibration is communicated to the car. These cars use as a fuel benzine, the cost of which is only 1 cent to 1.25 cents per hp-hour, as compared with 1.8 cents for gasoline. It is recommended that the higher grade fuel should be used for starting in cold weather, as the benzine cannot be relied upon to vaporize as readily. It is also necessary to heat the benzine in case it is exposed to freezing temperatures. One of the latest Prussian cars is 52 ft. 6 in. long, exclusive of the projecting truck, and weighs 47 metric tons. It has a maximum speed of 31 m.p.h., a radius of action of 62 miles, and an equipment consisting of a 100-hp benzine engine, a 66-kw generator, an exciter and two 82-hp commutating-pole motors. The Deutz company, builders of this gasoline car, has also made benzine-electric cars, which, when carrying 484 lb. of fuel, have a radius of action of 124 miles, which circumstance Mr. Ziffer believes indicates their superiority to accumulator cars for long distances. The Deutz engines are also adapted to use alcohol as fuel. The latest cars of the Prussian State Railways will have 170-hp engine equipments and run at a maximum speed of 43.2 m.p.h.

An interesting example of the possibilities of the gas-electric car for narrow-gage (39.37 in.) service is quoted in the case of the East German Railways' line between Pogegen and Schmalleningren, Prussia. This road is 34.1 miles long, has a maximum grade of 1.67 per cent and twenty-one regular stops. The usual train consists of one French-Westinghouse double-end motor car weighing 14 metric tons and seating twenty-nine passengers, and one or two trailers, seating forty passengers each. There is no difficulty in maintaining the schedule even when two trailers are operated. From Nov. 11, 1908, to April 30, 1910, the engines were operated with gasoline and the cars ran from 68.2 miles to 136.4 miles a day without a failure. Beginning May 1, 1910, the engines were supplied with benzine. During the gasoline period 23,906 motor-car miles were operated at a cost of $1,850 for fuel, lubricants, maintenance and lighting, or 7.8 cents per car mile. During the reported part of the benzine period, namely, May 1, 1910, to June 30, 1911, 15,972 motor-car miles were operated for $785.75, or about 5 cents per car mile. The consumption of electrical energy was 46.4 watt-hours per ton-mile. The replacement charges were negligible during the first two years and even for the third year amounted to not more than $75. The steam locomotives on the same line cost $41.25 per 1000 km (620 miles), or 6.6 cents per locomotive mile. The Pogegen cars have a 50-hp engine and a 32-kw generator which are placed in the front cab. Each truck carries a 25-hp motor. The weight of an equipped car is about 15.5 metric tons and with two trailers about 30.5 metric tons, including ninety-three seated passengers in the three cars. The cost of a completely equipped car is about $7,125. This design has been so successful that the railway intends to use it on other narrow-gage lines.

The Grand Duchy of Oldenburg has been operating, since Oct. 10, 1910, a gas-electric car which is furnished with a Deutz engine and Allgemeine electric equipment, the latter including the Ward Leonard system of control. The 65-kw generator carries an exciter on its shaft for exciting the main generator, lighting, etc. The two geared motors have a total capacity of 150 hp and are operated in parallel. They are mounted on the same truck. The car is operated double-ended, hauls one or more trailers and is interpolated with regular steam trains. It has room for sixty seated and forty standing passengers and runs at a maximum speed of 37.2 m.p.h. on level track.

Among other German lines described by Mr. Ziffer is the Grunau-Schmökwitz Railway near Berlin, which is the first German standard-gage street railway to use gas-electric cars. Each of the three cars on this road carries a 30-hp benzine engine, a 20-kw generator and two 20-hp motors. Each car has room for twenty-three seated and eleven standing passengers.

### GAS-ELECTRIC CARS IN BELGIUM

The principal installation in Belgium consists of five benzine-electric cars built according to the Henri Pieper system and constructed by the International Electric Company, Liège. The cars are of the double-truck type for 39.37-in. gage, carrying thirty seated and twenty standing passengers, in addition to which a baggage compartment is placed in the center. These cars are operated up to a speed of 18.6 m.p.h., and when they carry their full-load weight or 12 tons they operate successfully at 12.4 m.p.h. on grades of 3.5 per cent, and at 9.6 m.p.h. on grades of 5 per cent. The engine is rated at from 40 hp to 50 hp. These cars have been in service since February, 1911, and it is estimated that they will run at least 18,600 miles per annum. The double-truck cars cost about $10,600 each. The operator, the Société Nationale des Chemins de fer Vicinaux, believes that cars of this type are desirable for the development of suburban traffic until such time as the lines justify electrification. It also considers them desirable for helping out on peak-load service. Their disadvantages, however, are high first cost and more complicated maintenance. The company is planning to test several types of competing gas-electric cars.

In the three standard types of Pieper cars the operating equipment comprises a gas engine, a generator which is

mounted on the engine shaft and which serves also as a flywheel and a storage battery. On normal loads the car is driven by the engine alone while its surplus energy is stored by the generator in the accumulators. On heavy loads, however, this stored energy is made available by converting the generator into a motor-auxiliary for the engine. The smallest car weighs 8 to 10 metric tons, has a 40-hp to 50-hp generating set, a 60-cell battery, and accommodates twenty seated and twenty standing passengers. The second type has a 90-hp engine and sixty-cell battery, seats fifty to sixty passengers and has a baggage compartment. The largest Pieper car has 100 seats, is built for a speed of 37.2 m.p.h. and carries a 150-hp engine, two generators and a 120-cell battery. The same builder has also made plans for a car with a 250-hp engine to run at 74.4 m.p.h. By means of a multiple unit system two Pieper gas-electric cars can be operated with three or four trailers to carry 500 to 600 passengers with only one motorman at a speed of 62 m.p.h. to 74.4 m.p.h. The gas-electric apparatus of these motor cars is carried on a truck and started by compressed air. The batteries are of the Tudor type.

### GAS-ELECTRIC CARS IN FRANCE

The gas-electric installations in France include a line at Poissy, where a Pieper 90-hp car is used on a road 3.4 miles long. From April to the end of October, 1911, this car, including the use of two trailers, ran 9429 miles. The cost of benzine was 5.1 cents per car mile and 7 cents per train mile. The cost of lubrication was 0.48 cent per train mile. This car has operated 12,400 miles without requiring any repairs or other maintenance. It is believed that in practice the cost of maintaining the equipment, including the storage batteries, will not exceed 2.2 cents per train mile.

Another French installation is that of the Dinard à Saint-Briac Tramways, 5.7 miles long. The line is of 39.37-in. gage. The cars are of the French-Westinghouse type equipped with a 60-hp engine. They are about 37 ft. long, weigh 20 tons and have room for twenty-four seated passengers, sixteen standing passengers and a baggage compartment. They frequently haul two twenty-six-seat, 6-ton trailers, at a speed of 31 m.p.h. The cost of the benzine per car mile is about 9.6 cents.

### MISCELLANEOUS GAS-ELECTRIC INSTALLATIONS

Among the English installations described is the 90-hp forty-passenger gas-electric car built by the British Thomson-Houston Company for the Slough-Windsor line of the Great Eastern Railway, the Straker-Squire thirty-passenger 22-ft. car with 35-hp engine and the gasoline inspection car of the North Eastern Railway Company.

The principal installation in Holland is that of the Ooster Stoomtram Mattschappij, a narrow-gage road which operates eighteen French-Westinghouse cars over a line 33.5 miles long between Zeist and Arnhem. These cars have been in operation since July, 1910. The maximum running speed is about 25 m.p.h. As many as four trailers are employed. The engine is rated at 90 hp and the generator at 50 kw. The total weight of the complete car is 18 metric tons and its cost about $8000.

The Hungarian cars, as furnished by the Weitzer company, of Arad, Hungary, weigh 20.7 metric tons in the smaller or 25-hp sizes. The cars with 70-hp engines weigh 35.2 metric tons. The smaller cars seat twenty passengers and operate with a trailer at 18.6 m.p.h. The larger cars seat forty passengers with trailer and operate at 31 m.p.h. One of these larger cars for narrow gage costs $5,932 and for standard gage $7,700. The Ganz company, in conjunction with the Danubius company, of Budapest, has also constructed gas-electric cars, the results with which are not yet available.

### STORAGE BATTERY CARS

The third part of the report deals with accumulator cars. Mr. Ziffer describes in detail the storage battery car practice of the Hessian-Prussian State Railways, which had 139 cars in service when his data were secured and which had then been planned for a total of 172 cars. These cars are of the twin-body type which were last described in the Electric Railway Journal for Dec. 2, 1911. The total weight of an empty car equipped is 55 metric tons and with passengers 62 tons. The usual accumulator equipment consists of an eighty-four-cell battery, having a capacity of 368 amp-hr., and two 80-hp, 300-volt commutating-pole series-wound motors. The cars can run 62 miles on a single charge at speeds up to 37.2 m.p.h. The cost of operation and maintenance, including platform expenses, interest, amortization and current for the batteries, averages 32 cents per car mile. Of this amount 3.4 cents to 3.5 cents per car mile is charged to the renewal of the batteries as per the maintenance contract of the battery maker, the Akkumulatoren-Fabrik Aktien-Gesellschaft. The cost of one of these cars is approximately $20,000.

For the calendar years 1908 and 1909 the cost of operating fifty-seven of these cars was 20 cents per car mile, of which 4.8 cents was charged to cost of purchased energy, 4 cents to platform expenses, 5.2 cents to maintenance of cars and batteries, 5 cents to interest and amortization, 0.5 cent to miscellaneous expenses, such as heating, lighting, lubrication and cleaning.

It is reported that in the Breslau district four of these cars operated 93,287 miles from Oct. 1, 1910, to Sept. 30, 1911. The cars ran 62 miles on a charge which required one and one-half to two hours. The current was purchased at 1.6 cents per kw-hour. At Frankfort-on-Main a trial is being made of an accumulator car which is equipped with two shunt-wound motors. It is estimated that these motors will effect a saving of 20 per cent in energy under favorable conditions.

The Bavarian State Railways are using four accumulator cars of smaller type (62-ft. instead of 84-ft. length) built by the A. G. Rastatt company. Their battery consists of two Tudor seventy-eight-cell compartments which have a total capacity of 105 amp-hr. The batteries are charged regularly after running 27 miles, the duration of the charge being about seventy-five minutes. These cars cost $14,325 each.

Practically all the rest of Mr. Ziffer's report is devoted to self-propelled car development in the United States.

### CONCLUSIONS

Mr. Ziffer divides the self-propelled car into four classes, namely, steam, gasoline, gas-electric and storage battery, in stating the following conclusions:

The steam car has not made much notable progress. The straight gasoline car seems to be practically abandoned with the conspicuous exception of the McKeen car development in the United States. The gas-electric system seems to offer the most interesting possibilities at present. This type of car possesses numerous advantages which entitle it to consideration, although no complete costs are yet available. It is more flexible than other fuel combustion systems, its apparatus is easy to handle, and where a low-grade fuel like benzine is used the fuel expense is not high. However, the interest and amortization on a first cost of say $17,500 per car, as in the case of the Hessian-Prussian cars, is a very serious matter.

The storage battery car has given successful service both in Germany and in the United States, but like the gas-electric car it is still impossible to define its economic position. The first cost of the German battery cars, $20,000, is high, and it is still too soon to know the useful life of the batteries.

On the whole, despite the progress realized in self-propelled cars, it is yet too early to determine what type will prove most suitable. Each case should be studied by itself, as it is difficult if not impossible to formulate general rules. It may not be long, however, before some universally acceptable car is perfected.

# METHODS OF DETERMINING THE WAGES OF EMPLOYEES

BY OSCAR T. CROSBY, PRESIDENT WILMINGTON & PHILADELPHIA TRACTION COMPANY AND TRENTON & MERCER COUNTY TRACTION CORPORATION

It has occurred to me that students of the problem of wage determination might be aided by having a schedule of some of the variants which should affect the pay of persons performing the same general class of service.

Many investigators believe that the piece-work system carries with it the best solution of the wage problem from the point of view both of the employer and employee. This conclusion, however, is resisted by other persons, particularly those of the employee class. Furthermore, it is extremely difficult to apply the piece-work system to many lines of employment. On the other hand, it is desirable as far as possible to adjust the man's pay to the service which he renders. Assuming that the piece-work system for any reason whatever cannot be applied in a given case, I believe the elements below mentioned, if given their proper relative values, would lead to the establishment of just discriminations between various employees.

I am aware that in the treatment given to the matter of continuous service I seem to be at variance with most of those of the employing class who have formulated their views. Nevertheless, the things expressed by the propositions below made in this respect are based upon observation of the fact that there is resistance on the part of a great many employees to any scheme which binds up the rewards of to-day and the status of a period twenty years or more in the future, with continuity of service during the whole intervening period.

I myself would not be satisfied with such an arrangement, and I believe that all workmen who feel so should have an opportunity to act upon that basis without giving up anything of the present value of their labor. On the other hand, a workman who thus contentedly looks forward to long years of service with one company should not be debarred from obtaining such privilege as the company feels willing to give in exchange for such continuity of service. The scheme below presented provides that both these types of workman may be provided for.

The other features appearing below are more familiar and doubtless more in line with the usual thought on the subject. Their presentation in this form is only, therefore, of such value as comes from the systematic bringing together of different elements.

The variants in question are as follows:

A. Whether the applicant is an apprentice in the service undertaken.

The following rules may be considered to govern the employment of apprentices:

(1) Certificate of a former employer is to be taken as *prima facie* evidence of qualification.

(2) Demonstration of average skill, satisfactory to present employers, is to be the only final evidence binding upon present employer as to whether an employee should be paid at the apprentice rate.

(3) Beginners are to be notified that, subject to good behavior and the immediate exercise of such qualities as under supervision would reasonably guarantee life and property affected by their acts, they are entitled to a period of trial (possibly different for each occupation), and at the end of that time, if average skill has been reached, they will be paid the higher graduate rate.

(4) No limitation is to be set to the number of apprentices that may be employed at a given time, the ratio to vary as determined by the desires of applicants and of employees.

B. Familiarity of the employee with particular conditions affecting the service undertaken, whether the employee is an apprentice or a graduate in the general occupation in question.

For instance, a motorman familiar with one trolley company's lines may require a period of instruction before being fully competent on the lines of another company. During this period (which would usually not exceed one month) a graduate may receive pay less than full rate. When a graduate in any occupation shall have been engaged long enough in any particular job to be as competent as the average of other graduate employees, then the length of service with the particular employer shall no longer enter, as such, into the determination of his pay, unless the employee is fifty years or more old.

C. Age of employee.

After the age of fifty years continuity of service should be taken as the basis for an increase of pay. This increase should be a premium paid at the end of each year's continuous service.

D. Indirect pay, such as life insurance and sick relief, if established in general terms for all employees of a given class, should be commuted, at the option of any particular employee, on thirty days' notice, into a present increase of pay equivalent to the cost to the employer of the indirect pay in question. This option should be exercised once only.

E. Efficiency.

An increase of pay, through distribution of premiums, should be based upon records of efficiency whenever it is possible to establish a reasonable relation between the skill of an employee and the resulting decrease of expense or increase of revenue to the employer. Motormen and conductors of electric cars present cases of some difficulty in this respect. Nevertheless, it is quite possible reasonably to connect their pay with the following elements:

(1) Average number and character of accidents which may be wholly or partly attributable to the employee's neglect.

(2) Average consumption of power per stated unit.

(3) Average accuracy of schedule maintained.

Periods for these determinations should not exceed one year and should, in general, be shorter.

F. Increase of gross revenue and, separately, increase of net revenue.

Any increase of pay due to increase of gross revenue should be small; that which is based upon increase of net revenue should be relatively large. Premiums under this heading might, in many enterprises, be necessarily calculated at the end of a yearly period. Whenever possible the period should be shorter. The average employee does not think in terms of a year.

G. Retired pay should be based upon continuity of service and rate of pay at retirement, but the continuity of service should not be based upon service before the age of fifty.

The reason for not counting in a pay scheme length of continuous service before the age of fifty is this: Any man in his earlier life may fairly be assumed to desire some experimenting as to place and character of employment. He should be paid in full for his services, when and as performed. After fifty he may be assumed to have "found himself," to have "struck his pace." Now he wants certainty and protection for his old age. If he can get an old-age premium, in the way of higher pay for continuous service and possibly retired pay, then the self-interest of younger men should not stand in the way. They may prefer to preserve the liberty of frequent changes, including an occasional strike. The older man should be permitted to bargain for his security.

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The Austrian Ministry of Railways has granted a concession for the construction of a high-speed electric railway from Vienna to Brunn, a distance of 130 miles.

# AUTOMATIC BLOCK SYSTEMS WITH LIGHT SIGNALS ON TWO INTERURBAN RAILWAYS

The Indiana Union Traction Company and the Terre Haute, Indianapolis & Eastern Traction Company have just completed and put into operation installations of automatic

**Indiana Signals—Block Indicator—View of Home Signal, Showing Hooded Lights**

block signals with light indications upon congested stretches of their tracks. On the former road the Anderson division has been equipped from Siding 13 to and including Siding 22, a distance of 16 miles, not including sidings. On the Terre Haute, Indianapolis & Eastern Traction Company 15 miles of the Brazil and Terre Haute division between Duffs and Junction has been provided with signals.

In both installations the indication is given by hooded lamps instead of by the older and better-known semaphore arm signals, and this method possesses pronounced advantages both in first cost and in maintenance charges because of the absolute elimination of all moving parts except those in the relays, the indications being changed by switching current on or off differently colored high-powered lamps. The signal lights, as shown in the accompanying halftones, are hooded to shade them from the rays of the sun, and the important indication, the red stop signal, is in this way made distinguishable at a distance of from 1200 ft. to 1500 ft., even in a bright sunlight with snow upon the ground. The indications given in this way during the dusk of morning or evening are, in fact, even better than those given by semaphore blades in connection with lights designed only for darkness.

Both installations employ the General Railway Signal Company's absolute-permissive block signal system, which provides absolute blocking against opposing movements within the same block but allows one train to follow another into the same block through the use of an additional light on the signal mast, thus giving a permissive or warning indication to the following train. This permissive system has distinct advantages where heavy grades exist or where speeds owing to any other cause must of necessity be slow. Under such circumstances to use the absolute block would involve a greatly increased headway between trains or else a heavy expense for intermediate signals.

The general construction and arrangement of the signals is as shown in the accompanying photograph. The two upper lights constitute the main signal, the lower of the three lights being the permissive signal. A cast-iron relay housing is installed at the base, in which are located all the relays, fuses and other apparatus required at the signal location. Reactance bonds are located at the ends of the blocks to permit the passage of the continuous propulsion current through the rails and at the same time resist the passage of the single-phase alternating-signal current between opposite rails. The control of the signals is by means of the continuous track circuit, both rails being retained for the return of the propulsion current throughout the entire signaled territory. All track and line relays are of the General Railway Company's Model 2, Form A, Universal type.

### INDIANA UNION TRACTION COMPANY'S INSTALLATION

The Indiana Union Traction Company's installation includes nine blocks, eighteen home signals and six distant signals. One of the unique features of the system consists in the use of but two line wires for the control of opposing signals, both the absolute and permissive indications being given over these same two wires, the circuit being so designed that, the permissive indication having been given, neither of the proceed signals into said piece of single track can be given until the permissive light has been extinguished. All of the sidings are double-ended, the signals being located on the same mast at the center point of the sidings. In view of this arrangement it will of course be impossible for a man at the switch to see both of the signals. For this and other reasons indicators are employed at the switches to serve as repeaters for the signals which cannot be seen and also to indicate the condition of the block governed by the normal danger signal. In certain cases time element attachments are used in connection with the indicators to prevent a movement from the siding simultaneously with a train entering the block at the other end.

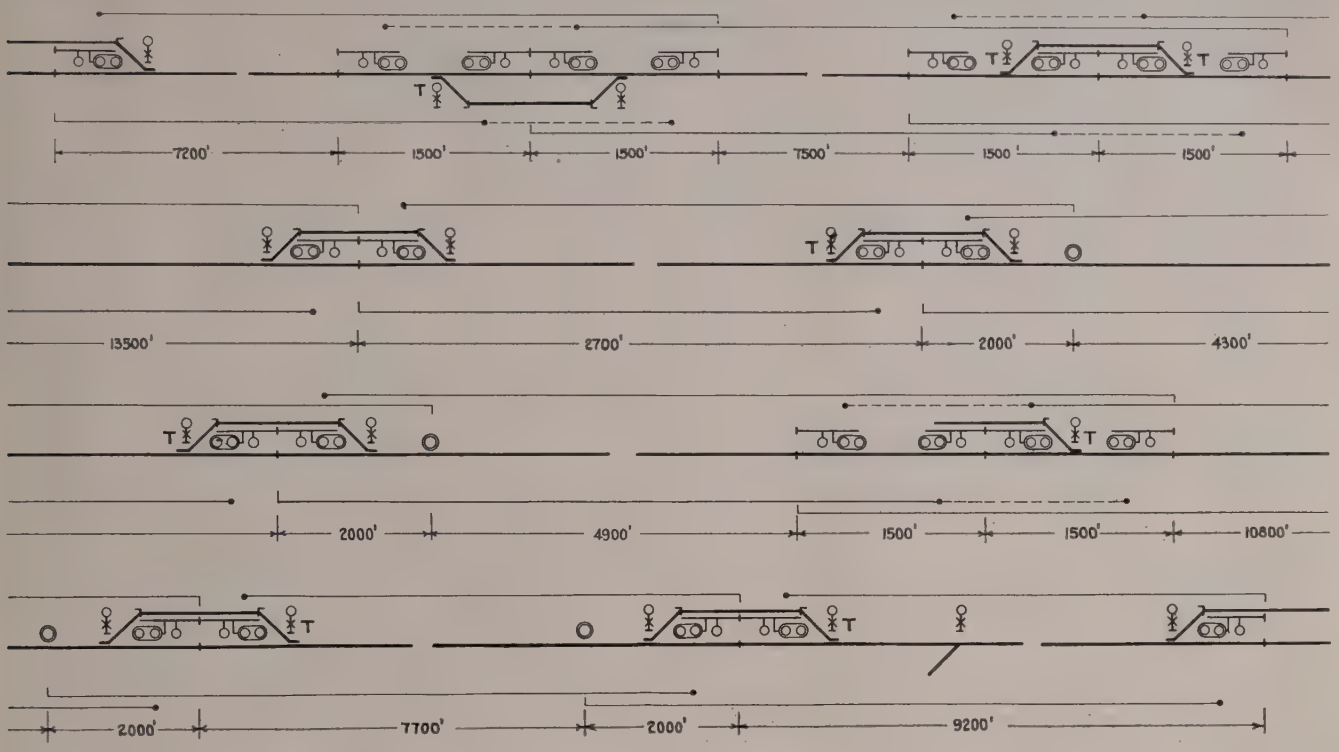
**Indiana Signals—General View, Showing Reactance Bonds in Track, Transformer on Pole and Switchstand with Indicator**

All indicators are normally clear provided the block is unoccupied. The time element indicators are interconnected with the system in such manner that when a switch has been thrown they will go to stop and not clear until after

a predetermined time has elapsed and provided the block has not been entered by a train in the meantime. The time element indicator, therefore, serves practically the same purpose as a preliminary track circuit, doing so at a greatly reduced cost. Distant signals are employed wherever a clear view of the home signal cannot be obtained a sufficient distance away to avoid slowing down. All distant signals will be controlled by track circuits which will cause them to assume the stop position with a train between the distant and home signal.

BLOCK INDICATORS

The General Railway Signal Company has developed a device which has been termed a block indicator for use in connection with the Indiana Union Traction signal system. This device provides a very simple means of indicating to the motorman whether or not an opposing block is occupied.




Indiana Signals—Diagram Showing Arrangement of Indiana Union Traction Installation

Indiana Signals—Relay Casing Interior—Front and Back of Switch Indicator

These block indicators, as shown by the accompanying halftone, are used at the commencement of all preliminaries to prevent a train approaching the meeting point from interfering with an opposing train which may be late. The control is such that the indicator is lighted if the opposing block is occupied, thereby indicating to the motorman that he may proceed to the siding without interfering with the opposing train.

SWITCH INDICATORS

Indications for occupied adjoining blocks are given at switch stands by a.c. indicators as usually furnished by the General Railway Signal Company, with the exception that the company has added a time interval device which mounts in the indicator, as shown by the illustration. There is also provided a cast-iron cover, as shown, which drops over the face of the indicator and which may be lifted by the trainman whenever the indicator is to be observed. It is the expectation that this cover will prevent the breaking of the glass by stones being thrown and will also keep sleet and snow from preventing the blade from being seen. A push-button or key-switch attachment can be added to the indicator as required. The movement may be either of the rotating non-magnetic shell type immune to the effects of direct current or of the "Z" armature type, the latter being somewhat less expensive and consuming less energy. In short, the indicator described and illustrated above is universal, performing all of the functions required in connection with switch indicators.

The automatic block signal system installed on the Terre Haute, Indianapolis & Eastern Traction Company, as before mentioned, governs approximately 15 miles of single track and includes six blocks and twelve signals. The arrangement and control of the signals and other details is the same as that employed in connection with the Indiana Union Traction system above described. The essential difference between the two systems consists in the use of stub end sidings on the Terre Haute, Indianapolis & Eastern Traction Company.

## DECISION IN THE LINCOLN HIGH-TENSION CASE

On Aug. 8 a decision for the plaintiff was handed down in the chancery branch of the Circuit Court of Logan County, Ill., in the case of the American Telephone & Telegraph Company versus the Springfield & Northeastern Traction Company, affecting the right to overbuild a telephone or telegraph line with a parallel high-tension transmission line on the same right-of-way. The complaint grew out of a situation which arose in the city of Lincoln, Ill., during the latter part of 1907.

At that time the traction company, which is one of the numerous companies making up the Illinois Traction System, commenced to build its road through Lincoln, forming part of a continuous route from Peoria, Ill., to Springfield, Ill., and points south. The single-phase traction system was employed, with catenary construction supported from span wires and a trolley-wire pressure of 3300 volts at 25 cycles. On one of the lines of poles, at the street curb, there was carried a 33,000-volt, three-phase transmission circuit and sundry low-tension wires for signaling or communicating purposes. At the southern outskirts of the city there was a transformer substation, similar to a number of others, receiving energy over the main transmission circuit from Peoria or Riverton, Ill., or both.

For a distance of about 700 ft. on one of the principal streets the line of 65-ft. wooden poles supporting both the span wires and the high-tension circuit was set in line with the poles of the telephone company, so that the 33,000-volt line was about 14 ft. above the telephone wires and parallel to them. The traction company's poles were of chestnut set 7 ft. in the ground, surrounded by 10 in. of concrete; the butt diameter was from 12 in. to 15 in., and the top was 7 in. to 8 in. Each pole carried three 2-in. by 4-in. fir cross-arms, one 10-ft. arm for the high-tension circuit and two shorter arms for the signal and telephone circuits. The transmission wire was No. 2 B. & S. gage bare copper, tied to pin-type porcelain insulators with three and a half turns of No. 6 B. & S. gage wire. The cross-arm braces were held to the arm by bolts and to the pole by a lag screw. In several places the poles of the traction company were in contact with the wires of the telephone company. On Sept. 23, 1907, the traction company's construction in this vicinity was completed.

The telephone company, on Nov. 20, 1907, served notice on the respondent that the construction was defective or dangerous and on Jan. 10, 1908, filed formal complaint. In substance the complainant averred that its telephone line had been a lawful occupant of the street in question for twelve years, under due authority of the State, county and municipality; that the transmission line constituted a serious menace to the property of the telephone company and the lives of employees and patrons and would serve its purpose equally well if constructed upon private right-of-way, removed a safe distance from other wires, and that the trolley wire also constituted a serious hazard because of the high voltage employed. Complainant finally averred that it was the traction company's duty, in so locating its line, to adopt and install known and approved safeguards, methods and protective devices, which would prevent its own line, carrying such dangerous electrical current, from coming in contact with the wires or other properties of complainant; that such safeguards, methods and devices are well known in the electrical art, and that such parallel overbuilding is contrary to approved and accepted methods of construction now in use. The bill requested a preliminary injunction restraining the use of the transmission and trolley circuits, later to be made permanent until the high-tension line might be removed to a safe distance and the trolley voltage reduced to a safe value, or until adequate safeguards and protection might be installed.

**Chicago Street, Lincoln, Ill., Showing Parallel Over-Building of Telephone Line by High-Tension Line**

In its answer the traction company denied in substance the existence of danger or hazard to life and property while the line was maintained in the safe condition that then characterized it and averred that the construction in all respects complied with the franchise granted by the city of Lincoln. It denied that it had failed to use the best known methods of construction and the most approved safeguards and protective devices for preventing contact between its wires and those of the complainant, and denied that the telephone company had adopted the safeguards, methods and protective devices well known to the art and accepted by those versed in it for preventing contact between the two systems. It denied that wind, snow, sleet or storm, or interference by persons or animals, commonly caused high-tension lines constructed like those in question to fail, as charged in the complaint.

Owing to the belief of the telephone company that it had an unusually clear case involving the question of pure hazard from parallel overhead high-tension wires, the issue was made a test case. A large amount of evidence was introduced and many of the leading electrical engineers of the country testified in behalf of the complainant. By agreement the high-tension line was not energized in the section under consideration, and during the progress of the case the traction company built a short detour to the east, installing a cradle where the line, at one place only, crossed over the telephone line. Also during the trial of the case the traction company abandoned the use of its single-phase traction system entirely, about the middle of 1909, and substituted everywhere the 600-volt direct-current system. The illustration shows the situation as it was originally when the action was brought.

Judge Harris in his opinion filed on Aug. 8 described both complainant and defendant as public-service corporations differing only in prior authority and occupation of street. The opinion states that the construction of the telephone line was such that the respondent could not complain of it, and from all the evidence of all the witnesses no protective device could be used in telephone construction which would safeguard it against a pressure of 33,000 volts or anything like it. After considering the question of the court's jurisdiction, the opinion goes on to state that "so far as concerns the respondent the complainant was occupying Chicago Street between Broadway and Clinton Street, not with any exclusive franchise, not with any amount of space to be measured and set off to it, but with the right as against the respondent to occupy so much of the street as was necessary for the successful operation of its business." A little further on the opinion says: "The thing to be guarded against by respondent in the construction of its line under the law, as I understand it, is such an interference as will prevent the practical operation of the telephone system."

The remainder of the opinion deals with the question of whether the respondent has so interfered with the rights of the complainant, considering alone the transmission line, that an injunction should be issued. Again the court stated that the respondent's duty was to use every reasonable safeguard to prevent accidents. Moreover, the court regarded the evidence as showing beyond dispute that with any of the construction described in the evidence accidents occur from such high-tension lines. Telephone, telegraph, electric light and power lines are not immune to decay or destruction caused by the elements. The evidence preponderated also on the proposition, in the court's judgment, that high-tension lines crossing over, under or paralleling low-tension lines introduce an element of danger which otherwise does not exist, demanding extra precautions in the way of shorter spans, extra cross-arms and the use of screens or cradles. The judge recognized that cradles impose an extra burden on the line and tend to cause other trouble, but regarded them as necessary and pointed out that they are in use even by the respondent. The opinion then concludes as follows: "Therefore I find from the evidence that the construction of the transmission line of respondent upon Chicago Street between Broadway and Clinton Street in the city of Lincoln is not the best, most approved and modern construction. While practicable, it was not necessary to the successful operation of the railroad to be so located, but located by election of respondent under lawful authority and is a right belonging to respondent which the court will not set aside or order removed provided the respondent recognizes the rights belonging to complainant, to be by respondent protected, provided and equipped with the safeguard to minimize the dangerous and hazardous conditions that now exist. Injunction will be granted as prayed for in the bill, except as modified by these conclusions."

## ENTERTAINMENT COMMITTEE OF MANUFACTURERS' ASSOCIATION

Thomas Farmer, Jr., chairman of the entertainment committee of the American Electric Railway Manufacturers' Association, has announced the personnel of the entertainment committee as follows: Thomas Farmer, Jr., W. K. Beard, Thomas Cooper, D. I. Cooke, George R. Carr, W. G. Cory, J. T. Cunningham, Edward F. Chaffee, C. A. Dunkelberg, F. A. Elmquist, P. R. Forman, H. M. Frantz, Alfred Green, H. A. Hegeman, W. S. Hammond, Jr., W. G. Kaylor, H. J. Kenfield, W. A. Lake, C. W. Laskay, S. W. Midgley, H. L. Monroe, C. J. Olmstead, H. E. Oesterreich, C. F. Scott, J. J. Sinclair, J. E. Slimp, S. W. Trawick, W. H. Wilkinson.

## TESTS OF CROSS-ARMS

The Department of Agriculture, Forest Service, has recently been conducting some strength tests of cross-arms and results are embodied in Circular 204, just issued by the department. The material tested includes practically twelve cross-arms of each of the following seven groups: Douglas fir; shortleaf pine; longleaf pine, graded by the manufacturers as 50 per cent heart; longleaf pine, 75 per cent heart; longleaf pine, 100 per cent heart; Southern white cedar, and shortleaf pine, creosoted. Each of these cross-arms was tested in a 200,000-lb. Riehle universal testing machine. The comparative strength was a follows:

| | Average Maximum Load. |
|---|---|
| Longleaf pine, "75 per cent heart" | 10,180 |
| Longleaf pine, "100 per cent heart" | 9,780 |
| Shortleaf pine | 9,260 |
| Longleaf pine, "50 per cent heart" | 8,980 |
| Shortleaf pine, creosoted | 7,650 |
| Douglas fir | 7,590 |
| White cedar | 5,200 |

A summary in the report concludes with the statement that, all things considered, cross-arms of the species and dimensions tested are strong enough for ordinary use; with longer arms the strength is relatively of much more importance. With the standard 6-ft. cross-arm, however, the question of strength need not enter into calculations of line construction, except in the rare case of abrupt change in grade. The ability of the timber to resist decay and methods of preventing decay are considerations of greater importance.

A recent number of *Elektrische Kraftbetriebe und Bahnen* states that the Russian State Railways intend to electrify about 80.6 miles of double track for single-phase operation at a trolley voltage of 12,000 volts to 15,000 volts. The frequency has not yet been chosen. Energy is to be transmitted from a proposed hydroelectric station. The electrified sections, which will be in the suburban districts of St. Petersburg, will consist of a line from that city west to Oranienbaum and of another south to Gatschina and Siverstaja.

## SIMMEN SIGNAL SYSTEM OFFICIALLY APPROVED IN INDIANA

After a thorough examination of the Simmen system of railway signaling and train dispatching as operated for the last three months on 18 miles of the Indianapolis & Cincinnati Traction Company's lines, official approval has been granted by the Railroad Commission of Indiana for its continued use. The railway company is further ordered to install and have the same system in operation by Dec. 31, 1912, on its Indianapolis-Greensburg division from the junction at Indianapolis to Greensburg. In connection with this order, the commission recommends to the traction company that any further improvements and developments of the Simmen system, which are to be made under the direction of the commission and its block signal inspector, M. H. Hovey, should have special reference to such arrangements of the apparatus that it will be impossible for trains in one direction to receive signals intended for trains running in the other.

In view of the commission's approval, Charles L. Henry, president Indianapolis & Cincinnati Traction Company, has advised the manufacturer of this signal system, Northey-Plummer, Ltd., Indianapolis, Ind., and Toronto, Can., that the Indianapolis & Cincinnati Traction Company has definitely decided to have all of its lines equipped at once with the Simmen system. In view of the adoption of this system over its entire road, the railway will change the dispatcher's office from the present location at the Indianapolis junction to its office building in Rushville, and will operate the system on its Greensburg division by cross-country wires placed on the poles of its present transmission line. For the present, until its lines are extended, one dispatcher will operate the entire system, although later it may be found necessary to have the services of two dispatchers, but even in that event both will be placed in the Rushville office building. It is the company's intention to have its entire system, comprising 107 miles, equipped by Dec. 31, 1912.

## ELECTRIC ARC WELDING

The low cost and simplicity of welding by means of the electric arc makes this process, under some circumstances, the most satisfactory method of repairing defects in steel castings, according to B. M. Bowers in a paper recently read before the Associated Foundry Foremen at Philadelphia. The writer states that the efficiency of the ordinary electric arc weld is generally about 60 per cent of the original strength of the material, probably on account of oxidation, although greater efficiencies have been attained. The apparatus usually consists of a suitable tank filled with salt water and containing two steel plates, one of which is connected to the negative side of a direct-current line ranging in volage from 110 to 550. From the other plate the cable is run to one end of a carbon electrode consisting of a piece of ¾-in. wrought-iron pipe 18 in. long and threaded at the other end to carry a ¾-in. socket. In this socket a pair of steel clamps holds an arc carbon 1 in. in diameter and 6 in. long, tapering to a point. A wooden handle is placed over the pipe at the center to protect the operator's hand. The piece to be welded is connected to the positive side of the line, and by adjusting the steel plates submerged in the tank a current of any desired amperage can be obtained.

The intense heat and light from the arc necessitate the operator's wearing a mask over his head with colored glass eye-holes, and his hands should be protected by gauntlet gloves.

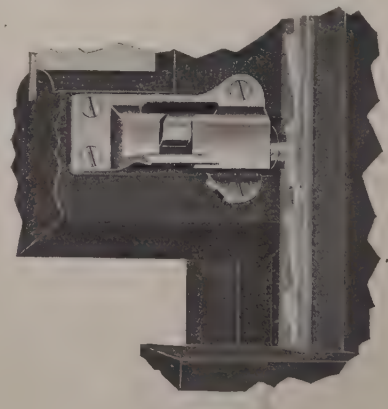
By bringing the carbon electrode in contact with the metal to be welded and then withdrawing it an arc is produced by which the metal can either be fused, molded or melted away entirely, as desired, the heat varying inversely as the length of the arc. While the arc is drawn, welding material is fed in slowly. This consists, for steel castings, of a soft steel wire about 5/16 in. in diameter and containing about 0.10 per cent carbon. Vigorous hammering should accompany each weld.

For burning off scales, fins, gates or risers a current of about 500 amp should be used, and by means of a smaller current blow-holes, sand spots, checks and cracks can be filled or lugs can be welded onto the casting.

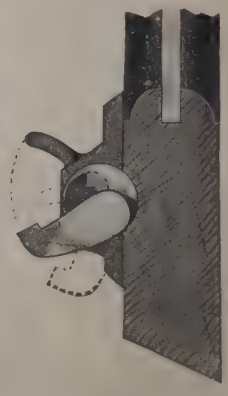
Castings should be heated before welding in a forge and welded while red hot, but reheating of the castings after welding is detrimental. The arc should be as long as possible in order to reduce excessive oxidation produced by the intense heat. At times a flux of melted and powdered borax is essential as it prevents oxidation by protecting the metal from the air. In welding brass or other metals with a low fusing point the casting must be supported in such a manner that the shape will be retained. The arc should also be applied at a low voltage and only for very short periods.

## SASH LOCK AND ANTI-RATTLER

The Dayton Manufacturing Company, Dayton, Ohio, is making an improved fixture for car windows known as the "Ardee" sash lock and anti-rattler, the details of which are shown in the accompanying cuts. The eccentric offset bolt of this lock permits it to be applied to the face of old or new sash frames without cutting the lower sash rail. Consequently the sash lock costs less to install, as no expensive fitting of the wood is needed. The mortise joint at the corner of the sash frame not only retains its full strength



Sash Lock



End View, Showing Offset Bolt

but is reinforced by the cast bronze lock case. The offset shape of the bolt allows the pawl to be easily and quickly withdrawn from engagement with the ratchet stop. A slight pressure on the finger piece is enough to operate this sash lock. When the pressure on the finger piece is removed the strong spiral spring holds the sash firmly against the outer guide strip and effectually prevents rattling.

The lock case is of cast bronze finished to match the other trimmings of the car; the eccentric bolt is a single steel drop forging and the operating spring is of phosphor bronze. This sash lock and anti-rattler is furnished either right or left with continuous cast bronze stops, suitable for any raise of sash, and with sash springs or compression rollers for the upper corners of the window, if required.

The first annual outing of the employees of the Union Traction Company of Indiana was held recently at Broad Ripple. Five cars carrying the employees were made up as a train and were drawn over the line by an electric locomotive. It is said that this is the longest passenger train ever handled by the company.

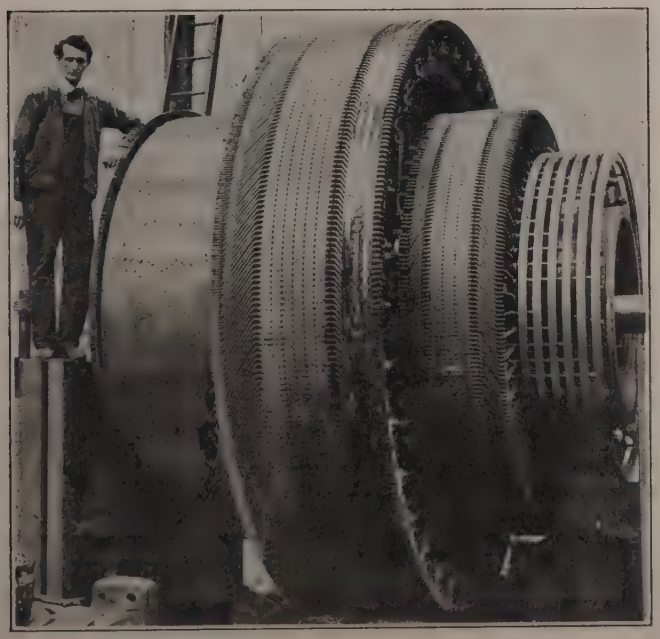
## 3000-KW VERTICAL, SYNCHRONOUS-BOOSTER, COMMUTATING-POLE ROTARY CONVERTERS

Two 3000-kw vertical, synchronous-booster, commutating-pole rotary converters have just been built and tested by the Westinghouse Electric & Manufacturing Company in its East Pittsburgh works. These two machines, which are of unusual interest because they are the largest vertical rotary converters ever constructed and because they are the only vertical converters ever built involving the synchronous-booster and commutating-pole features, are for the New York Edison Company for installation, respectively, in its Clinton and its Crosby Street substation.

The converters deliver a normal d.c. voltage of 270 volts, and for 25-cycle, six-phase operation. The d.c. voltage variation obtained by virtue of the booster feature is 15 per cent buck and 15 per cent boost from the normal voltage, giving a total direct-current voltage variation of 30 per cent. These machines were made of the vertical type to conform in general construction to the other converters in the substations, all of which are vertical machines.

The converter armature and frame are mounted above the booster armature and frame. The commutator is at the top of the machine and the collector rings at the bottom. The armature, as illustrated, consists of a rotary converter armature of the usual construction mounted on the same shaft with the smaller booster armature, which is connected in series with the converter armature so that when the booster field excitation is varied the a.c. voltage impressed on the converter armature will be decreased or increased accordingly.

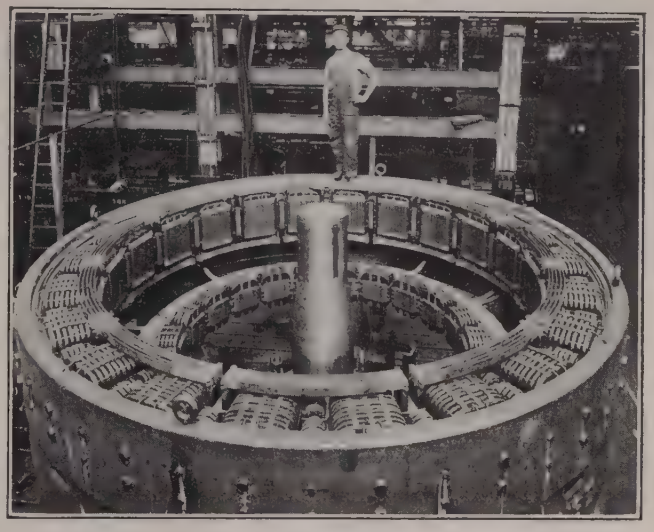
The main or converter poles are shunt-wound. The commutating poles which lie between the main poles have been wound to take care of variations in armature reaction introduced by the booster. The copper grids imbedded in the main pole faces do not extend from pole to pole as in ordinary machines, but are cut off flush with the sides of each main pole. This construction is used on all commutating pole converters, as it forms the most effective starting and damping winding. The booster poles are shunt-wound, and



Armatures for 3000-kw Converter and for Booster

the booster field is arranged for hand regulation. Provision is made for effective ventilation. A commutating-pole converter which is to be started from the a.c. end must be provided with a brush-lifting device, but inasmuch as these machines are to be started from the d.c. end, a brush-lifting arrangement is not necessary.

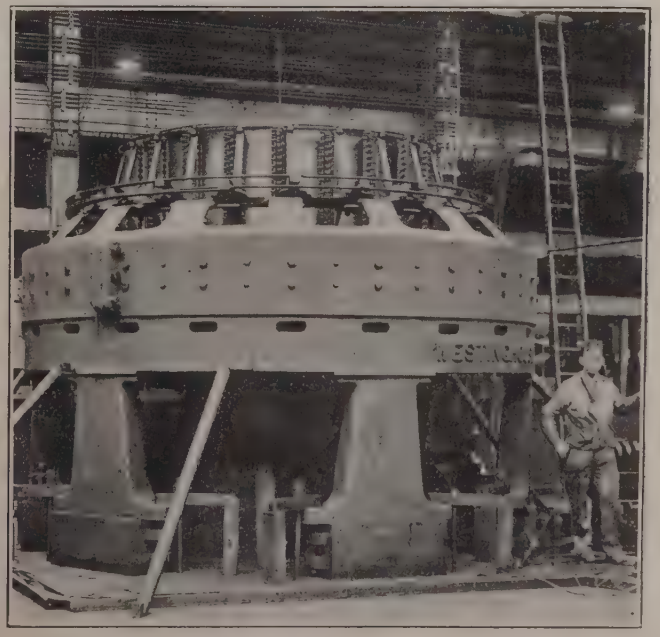
Some of the mechanical constructional features are also unique. Thus the pedestal on which the armature rotates is a one-piece hollow steel casting having a large area of base. The pedestal is tapered so that the upper bearing is smaller in diameter than the lower one. This facilitates assembly. The bearings proper are babbitted and cast in



Looking Down Into the Frame of the 3000-kw Vertical Converter

a sleeve which can be readily taken out of the converter spider for re-babbitting. A roller thrust bearing is arranged at the top of the pedestal to take the weight of the revolving element. To assume the weight of the rotating part at times when it is necessary to remove the top plate six 1¾-in. bolts are provided that turn through the lower portion of the pedestal flange. When it is necessary to take off the top plate these bolts are screwed up until they raise the rotating element a trifle and assume its weight.

Lubrication is effected with a gravity oiling system. The



View of 3000-kw Machine Set Up at the Works

oil is drawn from reservoirs and forced up through the oil pipe in the center of the pedestal. At the top of the pedestal the oil discharges through a nozzle into a cylindrical chamber within the roller bearing. The pressure on the oil forces it from this chamber out between the bearing rollers into an annular pan surrounding the roller bearing.

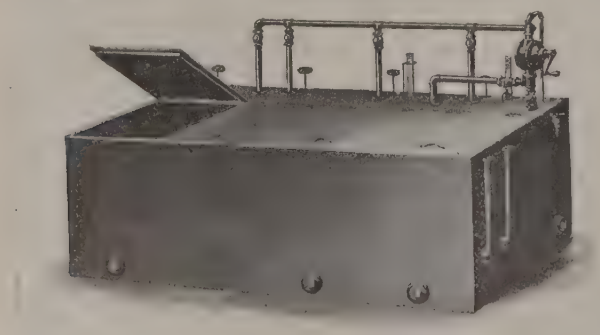
Oil cannot leave the chamber except through the bearing, and the height of the outlet nozzle and the oil pan rim are such that the bearing rollers always travel in a bath of oil. When the oil overflows from the pan around the roller bearing it passes into an annular chamber just above the upper pedestal bearing. From this chamber its only exit is through oil grooves in the pedestal. While it is passing through these grooves, the rotating babbitt bearing surfaces take up oil. From the upper pedestal bearing the oil flows down through the chamber around the shaft to oil grooves for the lower bearing similar to those hereinbefore described. From the lower oil grooves the oil discharges into an annular reservoir to the lower part of the pedestal, from which it drains into a storage reservoir to be circulated again through the lubricating system. An effective oil-thrower arrangement is provided at the upper part of the oil space and around the lower part of the pedestal which effectively prevents oil creepage up the shaft.

## THE MILWAUKEE SYSTEM FOR SATURATING JOURNAL BOX PACKING

The very general use of carefully saturated waste without addition of free oil for the lubrication of car journals is the natural outcome of the series of invariable successes which have followed the introduction of this method. Mileages of 10,000 and even of 15,000 under this plan are now by no means uncommon distances to be set as a standard interval between packings, and one large electric railway is even arranging to run its cars 20,000 miles between refillings of the journal boxes. The success of this method of lubrication is influenced to a great extent by the care with which the packing is applied, but it is naturally absolutely dependent upon the perfect saturation of the oil-soaked waste with which the box is packed.

In order to provide a device by which the proper degree of saturation can be assured at all times the Milwaukee Tank Works have developed the arrangement of saturating tanks and draining trays shown in the accompanying illustrations and termed the Milwaukee system. By its use, if waste is soaked in oil for twenty-four hours and then drained for forty-eight hours in accordance with what has been found to be the best practice, the labor of maintaining journal lubrication has been materially reduced and in some cases even cut to one-third of the amount of work required under the old method of using partially saturated waste with large amounts of free oil.

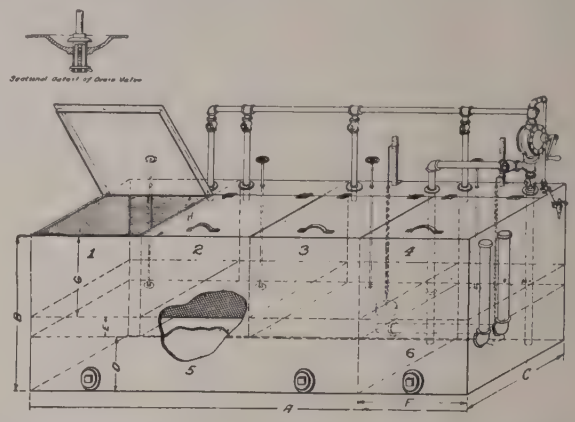
Referring to the accompanying line cut, the waste is placed in compartments 1, 2 and 3. The fresh oil is stored in compartment 5. Oil is pumped from compartment 5 into



**Milwaukee System—General View of Tanks**

upper compartments by means of the rotary pump mounted on top of the tank. Of the various kinds of pumps manufactured, this has proved to be the only one that is absolutely satisfactory for this purpose, under all conditions. It operates with great speed and ease.

After the waste is saturated, the drain valve handle is turned and the oil drains into compartment 5, from which it is used over again. The removable screens near the bottom of upper compartments serve to keep the waste from clogging up the drain valve. This drain valve is so constructed that it may always be closed tight, for the reason that it will cut strings or threads which would put any




**Milwaukee System—View Showing Interior Arrangement**

other kind of valve entirely out of commission. Compartments 4 and 6 are for re-saturating old waste. The oil which has been used to saturate old waste is thus kept separate from the new oil.

Large cleanout plugs are provided for both of the storage compartments. Both storage compartments are arranged to be filled from right-hand end and the pump is arranged to be operated so that the outfit can be placed against the wall or in a corner. All upper compartments have removable screens, dust-proof covers and improved drain valves. The two lower compartments are provided with float gages, to determine the quantity of oil in storage at any time. By means of a faucet at the right-hand end of the system, oil may be withdrawn and discharged into a can for any special purpose required.

The tanks are constructed of heavy metal and are thoroughly durable. One street railway reports that since the installation, nine months ago, of eight of these systems not one cent or one minute's time has been expended in repairs or adjustments.

The advantages claimed by the use of this system are:

First, the saving of about 20 per cent of the oil ordinarily used for a given number of cars.

Second, a big improvement in the quality of lubrication of car journals, which in many cases need just half the time or attention.

Third, the providing of a safe, clean and convenient storage for car oil, and the elimination of the leaky, dripping and unsightly oil barrels and cans.

Fourth, the providing of a complete system for handling the oil and waste which gives much more capacity in less space than other methods.

A set of tanks sufficient for a carhouse handling 100 cars occupies the small floor space of 3 ft. by 9 ft.

## ELECTIONS AT INTERNATIONAL CONVENTION.

At the convention of the International Street & Interurban Railway Association held at Christiania, Norway, July 2-5, Baron Janssen, who for a long time has been president of the association, was chosen honorary president. The new active president is Constantin de Burlet, general manager of the National System of Light Railways of Belgium. Five retiring members of the executive committee, Messrs. Hähner, Mariage, Geron, Bertini and Neiszen, were re-elected. The place of the meeting in 1914 will be decided later by the executive committee, but it will probably be either Berne or Budapest.

## ELECTRIC RAILWAY LEGAL DECISIONS

### CHARTERS, ORDINANCES AND FRANCHISES

**New Jersey.**—Charters—Transfers.

An ordinance granting to a company the right to construct and operate a street railway along the public streets of a city which provides for a system of transferring passengers, "subject to any future regulations of the board," does not estop the municipality from subsequently requiring that a transfer ticket be given, upon request, to any passenger who has paid his fare, entitling him to a continuous ride in either direction on any railway intersecting or connecting with the line upon which such transfer is to be given. (Public Service Ry. Co. v. Board of Public Utility Com'rs et al., 81 At. Rep., 1117.)

**New Jersey.**—Interstate Commerce—Franchise Tax.

The annual franchise tax which Secs. 4 and 5, Chap. 290, of the Laws of 1906 (P. L., pp. 645, 646) require the State Board of Assessors to levy upon such proportion of the annual gross receipts of a street railroad corporation as the length of its line in this State upon any street, highway, road, lane or other public place bears to the length of its whole line is not levied on the gross receipts of the corporation nor on the business of the corporation. It is merely an excise tax on the franchises of the corporation, viz., the franchise to exist and the franchise to occupy the streets, which are measured in part by the gross receipts. Therefore such franchise tax is not a regulation of interstate commerce, and the act under which it is levied is not in conflict with the clause of the Constitution of United States giving to Congress power to regulate commerce among the several states. (Phillipsburg Horse Car R. Co. v. State Board of Assessors et al., 81 At. Rep., 1122.)

**New York.**—Transfers—Recovery of Penalty.

The penalty for refusal of a transfer from one leased street railroad to another, provided for by the railroad law, Sec. 105, is allowable only in case of a contract of lease made under Sec. 78 of the railroad law, and an agreement whereby a city gave its consent to the leasing of several lines does not give any right of action, though it contained a provision calling for a continuous trip over all the lines for a single fare. (Lowenstein v. International Ry. Co., 132 N. Y. Sup., 653.)

**South Carolina.**—Eminent Domain—Nature and Extent of Power.

A provision in an ordinance granting a franchise to a consolidated electric railway company authorized on the part of the company a physical connection, merger and consolidation of the properties which it might acquire wherever it desired and permitted it to construct and lay such double tracks, curves, switches, etc., as it might deem proper for this purpose or for the purpose of rendering efficient service. Such a provision is not violative of Constitution, Art. 1, Sec. 3, Par. 1, providing that private property shall not be taken or damaged for public purposes without just and adequate compensation first being paid, though it makes no damages to the property of petitioners in constructing a double-track line. (Martin et al. v. Blackwell et al., 73 S. E. Rep., 630.)

**Virginia.**—Vendor and Purchaser of Land with Railway Easement.

Where defendant's deed recited that it was the intent of his grantor to convey all the property acquired by said grantor under a certain recorded deed, and that the property was subject to any easements created by the occupancy of a street railway, and the recorded deed referred to contained no reference to the easement of the street railway, it merely gave notice to the grantee that the street railway was in possession of part of the land conveyed, but not as to the railway's title. (Norfolk & Portsmouth Traction Co. v. C. B. White & Bros., 73 S. E. Rep., 467.)

**Washington.**—Assessment—Unfair Valuation.

It is not fair to cast out an assessment of one or more items of a taxpayer's assets because of unfair valuation, when the total assessment of all his property is not excessive. (Tacoma Ry. & Power Co. v. Pierce County et al.; Puget Sound Power Co. v. same; Old Colony Trust Co. v. same, 193 Fed. Rep., 90.)

**Washington.**—Federal Courts—Jurisdiction—Federal Question—Obligation of Contract—Impairment.

Where ordinances granting a city railway franchise reserved a conditional right of repeal in case the franchise was not operated in accordance with the provisions of the ordinances, a determination of the City Council of the question of fact that the grantee had violated the ordinances and that they should be repealed was not conclusive, and hence a suit to restrain the city and its officers from repealing the franchise ordinances and from enforcing such repealing ordinance on the ground that it constituted an impairment of complainant's contract rights in violation of the federal constitution, involved a federal question and was therefore within the jurisdiction of a federal court. (Seattle R. & S. Ry. Co. v. the City of Seattle et al., 190 Fed. Rep., 75.)

**Washington.**—Regulation of Charges—Operating Expenses—Depreciation and Replacement—Adequateness of Return on Investment—Evidence.

A railroad company may properly charge its returns with an annual sum to provide for depreciation and replacement and have such sum allowed in any determination of what is a proper return upon its investment, to be approximated in fixing its rates of carriage, but it cannot make the traffic of a future year bear all the burdens of the deterioration of past years, since each year should carry the burden of its own wear and tear, so that when renewals become necessary the burden is equally borne by all contributing features.

Rates charged by a common carrier can go no higher than the service is reasonably worth to the public, even though charges so limited would fail to produce a fair return to the carrier upon its investment, and where the carrying of 25 per cent of the total number of passengers carried by a street railroad company under rates affecting only 10 per cent of the passenger revenue at a rate less than what would be an adequate return for the use of its property affords it a profit over the actual cost of moving the passenger and is the only rate the passenger can afford to pay, such a rate is a reasonable rate, both to the company and to the public.

On the question of what rate of return upon its investment should be allowed to a street railway, that in the locality where the railway operated the prevailing rate of interest on loans running for a long time and backed by first-class security was 7 per cent, that on ordinary commercial paper the rate was 8 per cent, and that the railway appealing from rates ordered by the Railroad Commission had itself loaned to an allied corporation a large sum on its notes at 6 per cent, raising the amount by an issue of bonds, may be taken into consideration on the question of adequate return. (Puget Sound Electric Ry. v. Railroad Commission of Washington et al. (Hart et al., Interveners), 117 Pac. Rep., 739.)

**Wisconsin.**—Duty to Fence Track on Highway.

Where an electric railway company operated its track along a public highway in the outskirts of a city it was not required to fence its right-of-way under Statutes 1898, Sec. 1810, requiring railroad corporations to erect and maintain on both sides of every portion of their roads, with the exception of depot grounds, good and sufficient fences, etc. (Henke v. Milwaukee Electric Ry. & Light Co., 133 N. W. Rep., 1107.)

**Wisconsin.**—Eminent Domain—Compensation.

Statutes of 1898, Sec. 1849, provide that either party in condemnation proceedings may appeal to the Circuit Court from an award by commissioners, that the appeal shall be entered by setting down the owner as plaintiff and the corporation condemning the land as defendant; that such appeal shall be tried by jury unless a jury trial is waived by both parties, and that costs shall be allowed to the successful party. An owner withdrew an award of $1,200, paid into court by a corporation, and thereafter appealed from the award to the Circuit Court, where there was a verdict finding that the value of the land condemned was $730, on which judgment was rendered for defendant for $470, with interest and costs in the Circuit Court. Held, that under the statute the defendant railway company was entitled to such judgment. (Spies v. Chicago & M. Electric Ry. Co., 133 N. W. Rep., 1110.)

## LIABILITY FOR NEGLIGENCE

**Kentucky.**—Defective Streets—Liability.

A complaint alleging that plaintiff was injured through the joint and concurrent negligence of a city and a street railway company, the negligence of the city consisting in permitting the street to remain unsafe for public travel and the company's negligence consisting in starting a car suddenly while plaintiff was alighting, and that starting the car caused her to lose her balance and threw her into a hole constituting the defect in the street, etc., shows liability of the city.

That a street railway company was primarily bound to repair a defect in a street near its tracks does not relieve the city from liability to a traveler caused by such defect. (City of Louisville v. Arrowsmith, 140 S. K. Rep., 1022.)

**Louisiana.**—Start Signal Given by Conductor Inside Car—Evidence of Plaintiff's Physician.

When a street car has been stopped to allow passengers to alight and the conductor, being inside, starts the car without knowing the condition of affairs on the platform, he is guilty of negligence, nor does it affect the question that the conductor may have called out, "Is it all right back there?" and have heard an answer in the affirmative.

Where a woman suing for damages for personal injuries resulting from an accident has the benefit of the testimony of medical men selected by her as to her actual condition just after the accident and at the time of the trial, and the defendant is denied such benefit, by reason of her objecting to an examination by physicians selected by him or appointed as experts by the court, the testimony of the plaintiff's witnesses stands much upon the same footing as would that of an expert accountant named by one litigant in a case in which the other litigant has been denied all access to the account constituting the subject of the litigation. (Grant v. New Orleans Railway & Light Co., 56 So. Rep., 897.)

**Massachusetts.**—Injuries to Children.

Defendant street railway was driving a reach wagon loaded with 60-ft. rails along a city street, the front and rear wheels being 40 ft. to 50 ft. apart. Plaintiff, a child three and a half years old, wandered on to the street, and when first noticed was walking along the side of the wagon with his hand resting on the rails, being nearer the rear than the front wheels. He walked along for about 100 ft., when he stopped and was struck by a rear wheel. The horses were walking slowly, and the driver was looking forward. Held, that defendant was not negligent in failing to have men to protect plaintiff from being struck by the rear wheels, and the case was properly taken from the jury. (Stuart v. Holyoke St. Ry. Co., 96 N. E. Rep.)

**Michigan.**—Vehicle Crossing Tracks—Care Required.

A motorman who discovers the dangerous position of a traveler driving diagonally across the track, so that his vehicle at all times is so close to the track that the car cannot pass without colliding with the vehicle, must so control his car as to prevent a collision, if reasonably practicable, and this duty does not cease merely because the traveler drives more directly in front of the approaching car. (Clark v. Jackson Consol. Traction Co., 133 N. W. Rep., 927.)

**Missouri.**—Collision of Car with Vehicle Stopped by Pedestrian.

Plaintiff was driving along a street car track in order to avoid an obstruction in the carriageway, when an old man walked suddenly from the curb in front of plaintiff's horse, requiring the sudden stoppage of the buggy in front of a car approaching at a high rate of speed from the rear, which without gong or signal struck the buggy and caused the injuries complained of. Held, that the act of the man crossing the street in front of the buggy was at most a concurring or contributing cause, commingled with defendant's negligence, in colliding with the buggy without gong or signal, and that the latter was the proximate cause of the accident. (St. Louis Carbonating & Mfg. Co. v. United Rys. Co. of St. Louis, 141 S. W. Rep., 904.)

**Nebraska.**—Negligence—Questions for Court and Jury.

It is for the court to say what act or omission is evidence of negligence, but generally it is for the jury to say whether the evidence establishes negligence. (Nocita v. Omaha & C. B. St. Ry. Co., 131 N. W. Rep., 214.)

**New Jersey.**—Injuries to Pedestrian.

A pedestrian upon a crosswalk, where he might reasonably assume that the motorman of a street railway car would expect pedestrians to cross and would have the car under proper control accordingly, had a right to expect that the motorman would respect his right to cross the street if he was in position to justify such crossing, under a reasonable belief that he could safely do so if both he and the motorman exercised reasonable care. (Kraut v. Public Service Ry. Co., 81 At. Rep., 751.)

**New York.**—Discharge of Motorman No Evidence in Negligence Case.

In an action against a street railway company for injuries alleged to have been caused by a motorman's negligence, a ruling requiring a motorman to state whether he was discharged subsequent to the accident was erroneous as having no legitimate bearing on the issue of negligence. (Engel v. United Traction Co., 96 N. E. Rep., 731.)

**New York.**—Master and Servant—Injuries to Motorman—Vice-Principal.

A motorman brought his car into the barn, was engaged in fixing it for the night and was standing in the rear of his car, when a second car in charge of another motorman came into the barn and stopped 4 ft. away. The conductor of the second car turned the trolley pole around to the front, but as he was unable to place it the motorman of the second car made the contact. Thereupon the car moved suddenly forward, and the motorman of the first car was crushed between the cars. Held, that the motorman on the second car was a vice-principal to the other motorman, within railroad law (Laws 1890, Chap. 565), Sec. 42a, as added by Laws 1906, Chap. 657. (Gorman v. Brooklyn, Q. C. & S. R. Co., 131 N. Y. Sup., 686.)

**Oklahoma.**—Negligence — Contributory Negligence — Last Clear Chance.

In an action for damages on account of the alleged negligent act of defendant, it is error for the court to charge the jury that the plaintiff may recover notwithstanding his contributory negligence, if the defendant failed to exercise reasonable care to avoid the injury after it discovered, or by the exercise of reasonable care might have discovered, that an accident was imminent. (Oklahoma City Ry. Co. v. Barkett, 118 Pac. Rep., 350.)

**Oregon.**—Duties of Pedestrian.

A pedestrian in crossing a street railway track is not a trespasser on the right-of-way of the street railroad company nor bound by any strict rule of law, as when he approaches a steam railroad crossing, to stop, look and listen, nor to take special precautions to determine whether there is danger in going upon the track. (Seattle Electric Co. v. Hovden, 190 Fed. Rep., 7.)

**Pennsylvania.**—Injury to Passenger—Boarding Moving Street Car.

Where plaintiff in attempting to get on the platform of a moving street car succeeded in getting his feet on the lower step, when he was thrown off by the motion of the car, binding instructions for defendant are proper. (Bradney v. Philadelphia Rapid Transit Co., 81 At. Rep., 187.)

**Washington.**—Injury to Alighting Passenger from Clothing Caught in Car.

An instruction that if, while alighting from a street car, plaintiff's clothing caught on the car, and the conductor saw or might have seen it in using ordinary care, the conductor would be negligent in starting the car while plaintiff was thus entangled, was warranted by pleading and evidence that the car was negligently started while she was alighting after the car stopped. (Morrison v. Seattle Electric Co., 115 Pac. Rep., 1076.)

**Wisconsin.**—Master and Servant—Assumed Risk.

Where a decedent, an electric car conductor, was killed by being crushed between a car and a wall of the barn, evidence of a conversation between decedent and another conductor about two weeks prior to the accident in which deceased stated that he narrowly escaped the same sort of injury that morning and that he got his head in just in the nick of time, was competent to show that he had knowledge of the danger as bearing on the issue of assumed risk. (Jones v. Milwaukee Electric Ry. & Light Co., 133 N. W. Rep., 636.)

# News of Electric Railways

### Arbitration of Wages in Springfield and Worcester, Mass.

The arbitration board which is to fix the wages of employees of the Springfield Street Railway and the Worcester Consolidated Street Railway has held its sessions at the State House, Boston. The board consists of Dr. John W. Coughlin of Fall River, chairman; William P. Hayes, Springfield, who was named by the men, and Francis H. Dewey, president Worcester Consolidated Street Railway, who was named by the company. Charles W. Bosworth represented the companies and William B. Fitzgerald the men.

Mr. Fitzgerald said that the cost of living had increased to such an extent that the standard wage now was a less fair return for the labor than in the year 1910 and that the wages received by the employees were below those paid in Springfield and Worcester for other work requiring equal or less skill and application. He said that the increases of wage requested could be granted without great additional burden to the companies. Mr. Fitzgerald read some compilations of prices showing increases in the cost of necessities. The average increase in price of commodities, he stated, was 26.5 per cent in 1912 as compared with 1910. The average increase in prices of meats was stated to be 21.71. per cent. A number of exhibits showed the experiences of groups of men in Springfield and Worcester with different elements of the cost of living.

At the second session the arbitration board decided that any investigation should be made collectively by the board and not by the members individually. It was also decided that such an investigation should be based upon the testimony given at the hearing and not upon independent sources of information. The subject of overtime was brought up and Mr. Fitzgerald contended for the employees that this was one of the topics under consideration. Mr. Bosworth, representing the companies, stated that the subject for arbitration was wages and not overtime. A number of men employed by the companies testified regarding their working hours and wages.

Mr. Bosworth placed in evidence a statement of the wages paid by the Springfield and Worcester companies and by other street railway companies in New England. The rates on the Springfield road for conductors and motormen are as follows: For the first six months of the first year, $2.20 a day; for the second six months of the first year, $2.30 a day; for the second year, $2.35 a day; for the third year, $2.40 a day; for the fourth year, $2.45 a day; for the fifth year, $2.50 a day; thereafter $2.67½ a day. The company employs 530 conductors and motormen. Mr. Bosworth said that while men are paid for ten hours' work, they are actually engaged but nine and one-half hours. Mr. Fitzgerald said that the extra half hour was required for the preparation of reports.

The wages for conductors and motormen on the Worcester road, which are paid on the hourly basis, are as follows: For the first six months of the first year, 21½ cents an hour; for the second six months of the first year, 22 cents an hour; second year, 23 cents; third year, 23½ cents; fourth year, 24½ cents; fifth year, 25½ cents; sixth year and thereafter, 26¾ cents.

Mr. Bosworth presented a compilation of figures showing the amounts actually paid in wages during the first full week of April and the first full week in October, 1911. These two periods have been considered fair by the two sides represented at previous sessions of similar boards of arbitration. The men receive as high as $24 per week, including overtime. The average wage for conductors on the Springfield line was $16.24, not including absent men, or $15.43, including absent men. The average payment to motormen in Springfield was $17.06, not including absent men, and $16.49, including absent men. The average of the two classes of employees per man per week was $16.66 and the average per man per year was $866.32. On the Worcester road the average for conductors and motormen per man per week was $14.10 and per year $733.20. Figures were presented to show that the months of April and October were not quite up to the average. The company offered a table showing the wide range of the former occupation of its employees.

Henry C. Page, general manager of the Worcester road, testified that both companies allowed their men free transportation over their own lines, whether they wore their uniforms or not. This permitted the men to live at longer distances from their work and to secure lower rents.

### New Franchise Ordinance Proposed in Kansas City

The Metropolitan Street Railway, Kansas City, Mo., has submitted to Mayor Jost and City Counselor Evans the draft of a proposed new franchise ordinance. It provides for a 5-cent fare, a partnership supervision plan, and the organization of a new company to take over all street railway properties operated within the city. The draft of the ordinance was transmitted by Clyde Taylor, counsel for the company, and it was accompanied by a letter from R. J. Dunham and Ford F. Harvey, the receivers.

In referring to the subject of the rate of fare the receivers said in their letter that the proposed contract providing for 5-cent fares had been submitted to bankers and that they had agreed that the lines could be refinanced upon that basis. The tentative ordinance also provides for the preservation of the present universal transfer plan. The receivers declare that a reduction of fares would be impracticable with the present transfer scheme.

The ordinance contains a section which provides that the city shall receive half of the earnings above the expense of operation, taxes, repairs and depreciation and 5 per cent profit upon the agreed valuation. It is provided that the sum to be received by the city shall never be less than that under the peace agreement now in effect, and that this sum may, at the option of the city, be applied to the reduction of fares.

Provisions of the measure besides those mentioned are:

The preservation of the city's rights as to transfers, lights, paving, etc., under the peace agreement.

Agreement to be made on the present value of property, adding cost of putting it in perfect condition, also adding from time to time the cost of extensions and additions made under scrutiny of the city, the total to be the agreed valuation upon which the company shall receive 5 per cent profit. Bonds are not to be issued in excess of this total.

To insure the maintenance of the property in good condition a certain agreed percentage of the earnings shall be set aside. The city may use its share to reduce fares, to acquire the street railway property or for park purposes.

At any time, upon six months' notice, the city shall have the right to purchase the street railways, at the actual value ascertained in manner heretofore described.

The franchise shall be for a number of years, to be determined in conference, and shall be approved by popular vote.

When it expires the city may buy the property, designate a buyer, or the company shall continue to operate until a new franchise is granted and accepted.

Supervision of operation and expenditures shall be by a board of three engineers, the city engineer, the company engineer and the third an expert agreed upon by both city and company.

A new company shall be formed to take over all lines, the same to be free of encumbrance and subject to the terms of the franchise. This includes the Dodson line.

The latter provision would prevent the division of the system into its original parts and the abrogation of the universal transfer system through action of bondholders.

### Transit Affairs in New York

Bids for the construction of four additional sections of the new subway system were received by the New York Public Service Commission for the First District on Aug. 20 and will be opened on Sept. 10, 11, 12 and 13. The cost of these sections will probably be more than $10,000,000, which, added to the $61,000,000 already contracted for, will make, when the contracts are let, a total of more than

$71,000,000 of new subway work under contract. The four sections include one section in lower Manhattan, one section in the Bronx and two sections in Brooklyn. The Manhattan section lies in the southern part of Manhattan and will connect the proposed East River tunnel with the Broadway subway to be operated by the Brooklyn Rapid Transit Company. The Bronx section lies in 138th Street and Southern Boulevard and forms the first part of the Pelham Bay branch of the Lexington Avenue subway, which will be operated by the Interborough Rapid Transit Company. The two Brooklyn sections are an extension of the Fourth Avenue subway in Brooklyn from Forty-third Street down Fourth Avenue to Eighty-ninth Street and will be operated by the Brooklyn Rapid Transit Company.

Tentative locations of stations on the new subway lines to be operated by the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company, respectively, have been made by the New York Public Service Commission for the First District, and printed lists have been sent out to interested property owners. Public hearings will be given on these station locations on Sept. 12 and 13. On the first date the stations on the Brooklyn Rapid Transit Company's lines will be considered, and on the next day those on the lines of the Interborough Rapid Transit Company.

The Public Service Commission, First District, has received a petition from five surface railroad companies for the approval of a temporary permit granted by the Commissioner of Bridges on Feb. 29 last, for the operation of a trolley service over the Manhattan Bridge which was approved by the Board of Estimate on July 16. The companies include the Brooklyn Heights Railroad and the Nassau Electric Railroad, both in the Brooklyn Rapid Transit System, and the Coney Island & Brooklyn Railroad, in Brooklyn, and in Manhattan the New York Railways Company and the Dry Dock, East Broadway & Battery Railroad Company, which is a part of the Third Avenue Railway. It is proposed to operate a local service from Fulton Street and Gold Street in Brooklyn, over existing lines to and over the Manhattan Bridge to the Bowery in Manhattan and thence by way of Grand Street to Sullivan Street and extending to the Desbrosses Street ferry. This is the route which the Brooklyn & North River Railroad expects to operate, charging a 3-cent fare for local service or a 5-cent fare where a transfer is given to the various lines named in either borough. The permit is to be revocable on thirty days' notice. The commission will probably hold a hearing on the petition early next month.

## Reinstatement of Men in Boston

The question of the reinstatement of men who left the service of the Boston Elevated Railway during the recent strike has been a matter of negotiation between Frederic E. Snow, attorney for the company, and Joseph C. Pelletier, district attorney. In a letter addressed to Mr. Pelletier by Mr. Snow, the views of the company are set forth in part as follows:

"The company desires to co-operate with you, as far as it may properly do so, to remove at least some of the difficulties of the existing situation. The company does not believe that any of the strikers should be taken back and placed in control of its cars when there is reasonable ground to believe that they have been guilty of violence, endangering not only the persons and lives of the employees of the company, but also of innocent passengers. The State Board of Conciliation and Arbitration has, however, required the company to take such men back if they are acquitted by the Superior Court.

"The company will, of course, comply with that decision, but it does not feel justified in agreeing to take any one of the men back who have been convicted of violence by the lower court, except so far as it is actually required to do so by the terms of the decision of the State Board of Conciliation and Arbitration. I am informed, however, that there are a very large number of cases where strikers have been convicted in the lower courts of a breach of the peace and there was no acompanying violence or damage to persons or property. The company thinks that these cases stand very differently from those above referred to, and if upon an examination of the facts in any of these cases you are of opinion that individual cases should not be tried, but should be either not pressed or placed on file, the company will take back such men on the same basis as if they had been acquitted by the Superior Court, provided there are no specially aggravating circumstances in any particular case.

"I, therefore, suggest that you furnish the company as soon as convenient with a list of cases of the above charter which in your judgment would be either nol-prossed or placed on file. The company will then, without unnecessary delay, inform you as to whether or not there are any special circumstances in any particular case why it is unwilling to take back any of the men until they have been acquitted by the Superior Court."

Mr. Pelletier in his letter in reply said in part: "While I am district attorney, no man shall, with my consent, be convicted of any offence simply because there is 'reasonable ground' to believe him guilty. He shall be deemed guilty when a jury has so found, 'beyond a reasonable doubt,' as the law requires."

## Toledo Traction Situation

According to a statement made by W. E. Hutton, chairman of the stockholders' protective committee of the Toledo Railways & Light Company, negotiations with H. M. Byllesby & Company, Chicago, to finance the stockholders' plan of reorganization will be taken up again at an early date. The discussion of this matter was brought up by the very low price at which a block of the company's stock changed hands in New York recently. Mr. Hutton said there was no reason why the stock should be offered at the price given, except that the holder needed money. President Coates is also quoted as saying that there was no plausible excuse for the price of the stock.

The company will receive twenty new pay-as-you-enter cars the latter part of this month and they will be put into service at once. At that time the double track on Monroe Street, between Nineteenth Street and Lawrence Avenue, will also be completed. These improvements required an expenditure of about $180,000 and will improve the service in the business section of the city.

**Meeting of Keystone Railway Club.**—The next meeting of the Keystone Railway Club will be held at the Hotel Casey, Scranton, Pa., on Sept. 3, 1912.

**Paving Ordinance in Baltimore.**—An ordinance has been passed by the City Council of Baltimore, Md., requiring the United Railways & Electric Company to bear the cost of all new paving between its tracks and for 2 ft. on either side thereof.

**Chicago Subway Plans.**—A sub-committee of the local transportation committee of the Chicago City Council is considering plans for financing and laying out a comprehensive subway system. After its inspection of the subways in Boston, New York and Philadelphia the committee feels that it has a better understanding of the subject.

**Extension of Time Granted to Equip St. Louis Cars with New Fenders.**—The Board of Public Works has granted the United Railways, St. Louis, Mo., an extension of sixty days in which to complete the work of equipping its cars with new fenders. It is stated that nearly 75 per cent of the cars have been equipped with the new type of fenders.

**Campaign for Sanitation in New Orleans.**—D. A. Hegarty, general manager of the New Orleans (La.) Railway & Light Company, has notified the State Board of Health that in compliance with a notice from the board the company will install at once sanitary drinking fountains at all carhouses and other places where drinking water is provided for employees, and that paper towels that may be used individually will also be provided.

**Interurban Railway Terminal Problem at Cincinnati.**—R. W. Smith, who represented Bion J. Arnold in the investigation of the interurban railway terminal investigation at Cincinnati, Ohio, has completed his work. The investigation included plans for the entrance of all interurban lines into the city, terminal facilities, the cost of construction and the returns that may be reasonably expected. The report will be ready by Sept. 1, it is said. Mr. Arnold was engaged by the business organizations of the city.

**Revision of Operating Provisions Proposed in East Providence Franchise.**—Councilmen Hill and Thorpe have reported to the Town Council of East Providence, R. I., that at a conference with the officers of the Rhode Island Company in reference to the extension of transfer and 5-cent fare limits in the town the corporation expressed itself through D. F. Sherman, vice-president, and A. E. Potter, general manager, as ready to take up the matter of a new franchise. The Councilmen have been appointed a committee to ask the officials of the company for a 5-cent fare to the town limits, including Riverside.

**Bill Introduced to Incorporate Subway Company in Washington.**—Senator Johnston, of Alabama, has introduced in the Senate a bill to incorporate the Capital City Subway Company with authority to construct a subway and surface railway in Washington, D. C. The incorporators are Herbert F. L. Allen, Joseph A. Burkart, H. H. Lurton, Jr., Charles H. Ridenour, Charles E. Breckons and Charles L. Gulick. The bill provides that the construction of the subway shall begin in twelve months from the time of the organization of the company and shall be completed in four years. Construction of the surface line is to be begun in five years from time of organization of the company and be completed in three years. The company is to be authorized to charge a cash fare of 5 cents and to sell six tickets for a quarter. The capitalization of the company is not fixed. The allowable return on the capital is specified to be 10 per cent, and a provision is made for distributing at the end of a term of years one-half the surplus to the employees of the company, and the other half to the treasury of the United States.

**Improvements in Albany.**—In a letter to J. S. Kennedy, secretary of the New York Public Service Commission, Second District, James F. Hamilton, acting general manager of the United Traction Company, Albany, N. Y., writes that, in accordance with a conference he had with Chairman Stevens and Mr. Kennedy regarding certain improvements suggested by the commission, he has ordered a quantity of signs which will be installed at points on the Albany and the Troy divisions. These signs are of blue enamel with white letters and read "Cars stop here." Mr. Hamilton is also having one of the company's "500" type cars equipped with an illuminated dash sign, and has ordered that the headlight be taken from the deck of the car and placed on the front dash. This car will be in shape during the present week and will be submitted for the approval of the commission. The work of laying new track on Washington Avenue has been begun. Mr. Hamilton states that he has several improvements in mind which are in the course of development, chief among which is a proper device for opening and closing the exit doors of the "500" type cars.

**Chicago Wage Situation.**—No definite progress has been made in the Chicago wage increase controversy. After a truce of one week in which the officials of the two surface and elevated lines had the time to confer with financial interests in the East, negotiations were resumed between the representatives of the employees and railway companies on Friday, Aug. 16. The committee of railway employees served an ultimatum on Aug. 18 on the managers of the three railway companies stating that it was useless to follow the plan of negotiations with the managers, and that unless some definite action was taken at once, the whole controversy would be referred to Mayor Harrison to use his influence in bringing about a peaceable settlement. The Mayor has had two joint sessions of the railway managers and the employees' committee. It is understood that compromise working conditions have been accepted by all parties interested. The demands of the employees in regard to working conditions include a reduction in the maximum number of working hours to eleven hours. It is asserted that certain nine-hour runs extend over the demanded eleven-hour maximum, and that tripper runs require men to be on duty as long as eighteen hours. On Monday, Aug. 19, a strike vote was taken by the elevated employees which showed a large majority in favor of a strike. As the dispute now stands both the surface and elevated railways' employees have voted to strike in case the committee is unable to bring about a satisfactory settlement, but the Mayor is continuing his efforts toward an amicable adjustment.

# Financial and Corporate

## Stock and Money Markets.

Aug. 21, 1912.

Stocks listed on the New York Stock Exchange have been quiet in the last week. The volume of trading has been restricted, and on account of the lack of positive news affecting securities, the tendency of prices has not been strong in either direction. Prices of one or two special issues influenced by other than general conditions have shown marked changes. Westinghouse Electric Manufacturing Company common stock has continued its advance. Rates in the money market to-day were: Call, 2¾ and 3 per cent; sixty days, 3½ per cent; ninety days, 4¼ and 4½ per cent.

In the Philadelphia market there was about the usual amount of activity. Philadelphia Rapid Transit remained close to the same price which it held during the preceding week.

In the Chicago market there has been a little trading in Chicago Railways participating certificates, but no marked change in price.

In the Boston market Boston Elevated Railway has advanced a little further, maintaining most of the gain which it has made since the settlement of the strike.

United Railways & Electric Company stock has shown strength in the Baltimore market.

Quotations of traction and manufacturing securities as compared with last week follow:

| | Aug. 14. | Aug. 21. |
|---|---|---|
| American Brake Shoe & Foundry (common) | a96½ | a97½ |
| American Brake Shoe & Foundry (preferred) | a142¾ | a143 |
| American Cities Company (common) | a32⅛ | a31½ |
| American Cities Company (preferred) | 78½ | 76½ |
| American Light & Traction Company (common) | a430 | a425 |
| American Light & Traction Company (preferred) | a112 | a112 |
| American Railways Company | a43¾ | a43¾ |
| Aurora, Elgin & Chicago Railroad (common) | a47 | a47 |
| Aurora, Elgin & Chicago Railroad (preferred) | a89 | a88½ |
| Boston Elevated Railway | a125 | a126 |
| Boston Suburban Electric Companies (common) | *15 | a15 |
| Boston Suburban Electric Companies (preferred) | *80 | a80 |
| Boston & Worcester Electric Companies (common) | a10 | a10 |
| Boston & Worcester Electric Companies (preferred) | a53 | a52 |
| Brooklyn Rapid Transit Company | 93¼ | 92½ |
| Capital Traction Company, Washington | 123¼ | a125⅞ |
| Chicago City Railway | a190 | a190 |
| Chicago Elevated Railways (common) | a34 | a34 |
| Chicago Elevated Railways (preferred) | a92 | a91 |
| Chicago Railways, ptcptg., ctf. 1 | a92 | a90 |
| Chicago Railways, ptcptg., ctf. 2 | a24¾ | a24½ |
| Chicago Railways, ptcptg., ctf. 3 | a8½ | a8½ |
| Chicago Railways, ptcptg., ctf. 4 | a4 | a4½ |
| Cincinnati Street Railway | a131 | .... |
| Cleveland Railway | a106 | 105 |
| Cleveland, Southwestern & Columbus Ry. (common) | *5¼ | *5¼ |
| Cleveland, Southwestern & Columbus Ry. (preferred) | *35 | *35 |
| Columbus Railway & Light Company | a55 | a55 |
| Columbus Railway (common) | a80 | a85 |
| Columbus Railway (preferred) | a95 | a95 |
| Dayton Street Railway (common) | 25 | a25 |
| Dayton Street Railway (preferred) | 100 | a100 |
| Denver & Northwestern Railway | 140 | *140 |
| Detroit United Railway | 70 | 70 |
| General Electric Company | 183¼ | 183 |
| Georgia Railway & Electric Company (common) | a125 | a126½ |
| Georgia Railway & Electric Company (preferred) | a85 | a85 |
| Interborough Metropolitan Company (common) | 20¾ | 20¼ |
| Interborough Metropolitan Company (preferred) | 60½ | 60 |
| International Traction Co., 4% bond rcts | *75 | *75 |
| Kansas City Railway & Light Company (common) | 15¼ | a15½ |
| Kansas City Railway & Light Company (preferred) | a41 | a40½ |
| Lake Shore Electric Railway (common) | *8½ | *8½ |
| Lake Shore Electric Railway (1st preferred) | *85 | *85 |
| Lake Shore Electric Railway (2d preferred) | *22 | *22 |
| Manhattan Railway | 134 | 134 |
| Massachusetts Electric Companies (common) | a19 | a19¼ |
| Massachusetts Electric Companies (preferred) | a77 | a77½ |
| Milwaukee Electric Railway & Light (preferred) | *105 | *105 |
| Norfolk Railway & Light Company | 26 | 26 |
| North American Company | a83½ | 87¼ |
| Northern Ohio Light & Traction Company (common) | a70 | a71 |
| Northern Ohio Light & Traction Company (preferred) | a105 | a105 |
| Philadelphia Company, Pittsburgh (common) | a51¾ | a52 |
| Philadelphia Company, Pittsburgh (preferred) | a43¾ | a44 |
| Philadelphia Rapid Transit Company | a25½ | a25½ |
| Portland Railway, Light & Power Company | *69 | *69 |
| Public Service Corporation | 120 | 120 |
| Third Avenue Railway, New York | 38 | 37⅛ |
| Toledo Railways & Light Company | a8 | a4 |
| Twin City Rapid Transit Co., Minneapolis (common) | a108 | a107¾ |
| United Ry. & Electric Company (Baltimore) | 24⅞ | 24⅞ |
| United Rys. Inv. Company (common) | a33¼ | a33 |
| United Rys. Inv. Company (preferred) | 62⅞ | a61 |
| Virginia Railway & Power Company (common) | 44½ | *44½ |
| Virginia Railway & Power Company (preferred) | 87½ | 87½ |
| Washington Ry. & Electric Company (common) | 90 | a92 |
| Washington Ry. & Electric Company (preferred) | 94 | a95 |
| West End Street Railway, Boston (common) | 85½ | a86 |
| West End Street Railway, Boston (preferred) | 99 | a99 |
| Westinghouse Elec. & Mfg. Company | *84⅝ | 88 |
| Westinghouse Elec. & Mfg. Company (1st preferred) | a126 | 125 |

*Last sale. a Asked.

## ANNUAL REPORT

### Illinois Traction System

Earnings of the Illinois Traction System in the year ended Dec. 31, 1911, compare with the preceding year as follows:

| | 1911. | 1910. |
|---|---|---|
| Gross Earnings: | | |
| Interurban | $2,864,793 | $2,440,592 |
| Local street railway | 1,950,880 | 1,896,587 |
| Gas | 283,325 | 357,315 |
| Electric light and power | 1,473,937 | 1,322,581 |
| Steam heating | 197,738 | 174,822 |
| Miscellaneous | 31,548 | 26,140 |
| Total gross earnings | $6,902,221 | $6,218,037 |
| Operating expenses | $3,867,869 | $3,441,100 |
| General and overhead expense | 83,701 | 58,596 |
| Taxes | 182,071 | 165,932 |
| Total operating expenses | $4,133,641 | $3,665,628 |
| Net earnings | $2,768,580 | $2,552,409 |
| Less net earnings of Des Moines and Topeka properties prior to purchase | | 54,183 |
| Total net revenue of Illinois Traction Company | $2,768,580 | $2,498,226 |

There was deducted from the net revenue for 1911 as shown $1,885,222 for interest on bonds, etc., leaving available for dividends the sum of $883,358. Dividends on the preferred stock aggregated $318,276, leaving a surplus of $565,082 to be added to the balance sheet surplus. The surplus as of Dec. 31, 1911, was $1,988,233.

During 1911 $1,012,864, or 14.7 per cent of gross earnings, was expended for maintenance, renewals and betterments, as compared with $904,045, or 14.6 per cent, in the previous year.

A statement addressed to shareholders, signed by the president, W. B. McKinley, and the vice-president executive, H. E. Chubbuck, says in part:

"During the year very satisfactory progress has been made in all departments of the company's business, the gross revenue of which has been derived in the following manner: From interurban railroads, 41.51 per cent; from city street railways, 28.27 per cent; from electric lighting and power, 21.35 per cent; from gas lighting, 5.55 per cent; from steam heating, 2.86 per cent; from miscellaneous, 0.46 per cent.

"The surplus account stood at Dec. 31, 1911, as follows:

| | | |
|---|---|---|
| Balance brought forward from 1910 | | $1,764,420 |
| Net surplus for 1911 | | 565,082 |
| | | $2,329,502 |
| Appropriated for depreciation (in addition to $762,864 charged to operating account for maintenance, renewals and betterments) | $250,000 | |
| Bond discount of controlled companies | 91,269 | |
| | | 341,269 |
| Balance carried forward for 1911 | | $1,988,233 |

"The terminal facilities in St. Louis, including the bridge across the Mississippi River and the passenger and freight station at Twelfth and Lucas Streets, have now been in operation for a full year and have contributed to increase the traffic in and out of St. Louis. The belt lines around the cities of Granite City, Edwardsville, Springfield and Decatur, which were thrown open for traffic this year, have permitted the company to handle through freight in train-load units, and it is to this department that the management is now giving much time and attention. The economical handling of this freight, which is constantly increasing, is the present operating problem confronting the management.

"Connections with the steam railroads are being made, while sidings and increased facilities at the terminals are gradually being extended. Already several important factories have located along our tracks and special attention is being given to the building of new industries upon our own lines, the traffic from which will be handled entirely by this company. During the year ten elevators have been added and the movement of grain has naturally been increased.

"The contract which was entered into in 1910 with the Union Switch & Signal Company for the installation of block signals has been completed, and 75 miles of alternating-current, track-circuit, automatic electric signals are now in successful operation. These signals are equal to the most advanced type of automatic block signals installed on any steam railroad in the United States.

"We are pleased to report that the year 1911 was entirely free from accidents to passengers on the interurban or city lines.

"The earnings of the street railway lines have shown steady improvement. The rebuilding of portions of the street railway track during 1910 and 1911 in Bloomington, Decatur and Peoria has increased the company's facilities for handling traffic and should show in the future earnings of these properties. All of the company's street railway franchises are now in excellent shape.

"Next to the interurban, the electric lighting and power earnings show the largest increase for the year. In 1909 approximately 17½ per cent of the company's gross earnings were derived from the electric lighting and power business, while in 1911, in spite of the increases in all other departments, the receipts from electric lighting and from power were 21.35 per cent of the gross revenue.

"Your directors feel confident, with the efforts now being put forth by the management, that this very important department will show even better results in the future. The generating capacity of the several power houses is now considerably ahead of the ordinary needs for power, and in finding profitable use for the surplus the net earnings from this department should be highly satisfactory.

"The gas-lighting and steam-heating departments, although not producing as large returns as the others, are nevertheless important from the standpoint of profit. The output of gas is steadily increasing and all of the equipment is now in excellent condition.

"The physical condition of all the properties controlled by the company has been maintained in a high state of efficiency, and 14.7 per cent of the gross receipts was expended for this purpose, which includes, as usual, a very substantial sum written off for depreciation, etc.

"During the year 1911 the fixed charges increased $348,534; this largely represents the interest on the investment made by the company in bridge and terminals into St. Louis and in the several belt lines for freight referred to above. These additions and improvements were turned over to the operating department either at the close of 1910 or early in the present year, and the interest for a full year on the securities issued has now been deducted from the net earnings for the first time. There has also been an increase in the dividend charges on the preferred stock of $44,990. The increase in net earnings for 1911 over 1910 was not quite sufficient to absorb all of these additional charges of $393,000, which accounts for a decrease in the year's surplus as compared with 1910, when this large interest sum was chargeable to construction account. Your directors, however, consider this a very satisfactory showing. The increase in the fixed charges for 1912 and for the years to come will be very moderate in amount, as a large portion of the improvements and extensions necessary in every growing concern such as the Illinois Traction System can be provided out of the yearly surpluses."

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**Bay State Street Railway, Boston, Mass.**—The Board of Railroad Commissioners has approved the petition of the Bay State Street Railway for authority to issue 5 per cent coupon notes to an amount not exceeding $2,000,000. The proceeds of this issue are to be applied toward payment and retirement of floating indebtedness of the company. The board also grants the Bay State Street Railway authority to issue 14,700 shares of additional capital stock at $100 per share, the entire proceeds, amounting to $1,470,000, to be utilized in making necessary additions and improvements to the company's property.

**Central Illinois Traction Company, Paris, Ill.**—The Central Illinois Traction Company has increased its capital stock from $250,000 to $1,500,000.

**Civic Service Corporation, Philadelphia, Pa.**—The Civic Service Corporation has been incorporated to take over and operate gas, electric light and power, water works, electric railways and heating plants. The company was formed to take over the public utility and general engineering business which has been conducted by T. Wilson Battin and A. L. Osgood. G. Henry Stetson is president, T. Wilson Battin, vice-president and secretary, J. Lee Patton treasurer and A. L. Osgood general manager. The headquarters of the company are in Philadelphia.

**Clarksville Railway & Light Company, Clarksville, Tenn.**—New officers have been elected as follows in the Clarksville Railway & Light Company, the property of which was taken over some time ago by Montgomery, Clothier & Tyler, Phiadelphia, Pa., in the interest of the Kentucky Public Service Company: Edward D. Tolland, Jr., Louisville, Ky., president; Austin Peary, Clarksville, vice-president; William Dignan, Jr., Philadelphia, secretary and treasurer; A. C. Murray, Clarksville, general manager and purchasing agent.

**Columbia Gas & Electric Company, Cincinnati, Ohio.**—This company, which operates an electric railway between Cincinnati and Covington, Ky., in connection with the electric light and gas business, and which was recently taken over by A. B. Leach & Company and J. & W. Seligman & Company, of New York, was reorganized on Aug. 14 by the election of the following officers: P. G. Gossler, of A. B. Leach & Company, chairman of the board; A. B. Leach, president; James C. Ernst, F. B. Enslow, of Huntington, W. Va., and W. Y. Cartwright, general manager of the Hope Gas Company, Clarksburg, W. Va., vice-presidents, and W. T. Hunter, secretary and treasurer. Mr. Ernst will be in charge of the operation of the various properties controlled by the company. A. B. Leach was chosen president and James C. Ernst vice-president of the Union Gas & Electric Company, a subsidiary corporation, also. Archibald S. White, who sold his interest in the company recently, has retired from the directorate of both companies.

**Detroit (Mich.) United Railway.**—It is reported that the Detroit United Railway is negotiating for the right-of-way and the partly finished line of the Detroit & Highland Park Railway. The new company has a single-track line which connects outlying points with several lines of the Detroit United Railway.

**International Railway, Buffalo, N. Y.**—The Public Service Commission of the Second District of New York has authorized the International Railway to issue bonds secured by the Buffalo Railway consolidated mortgage to the amount of $294,000 to retire bonds issued by the Buffalo East Side Railway due on Sept. 1, 1912, and now held by the Bankers' Trust Company, New York, N. Y.

**Kansas City Railway & Light Company, Kansas City, Mo.**—At a meeting of the holders of the 6 per cent notes of the Kansas City Railway & Light Company held in New York on Aug. 16, 1912, a committee was formed to represent the holders of these notes. The deposit of the notes with the New York Trust Company, New York, N. Y., before Sept. 16, 1912, has been asked. The committee is composed of John B. Dennis, of Blair & Company; Samuel L. Fuller, of Kissell, Kinnicutt & Company; James J. Starrow, of Lee, Higginson & Company, and Paul M. Warburg, of Kuhn, Loeb & Company.

**Kansas City, Outer Belt & Electric Railroad, Kansas City, Mo.**—The Kansas City, Outer Belt & Electric Railroad Company having been organized in the interest of the Kansas City, Mexico & Orient Railway, which is in the hands of receivers, John W. Platten, Philip D. Tuckett, Jabez T. Odell and Edward Dickenson, at the request of the holders of a large amount of the fifty-year 4 per cent gold bonds of the company, have consented to act as a committee to protect the holders of these bonds. Bondholders are requested to deposit their bonds, having the April, 1912, and all subsequent coupons attached, with the United States Mortgage & Trust Company, New York, N. Y., the depositary named in a deposit agreement, dated as of Aug. 8, 1912, which the committee has had prepared, or with the First National Bank, Kansas City, Mo., or with Glyn, Mills, Currie & Company, London, Eng. After Sept. 14, 1912, no bonds will be accepted except upon such terms as the committee may prescribe. Calvert Brewer is secretary of the committee.

**Kentucky Utilities Company, Louisville, Ky.**—The Kentucky Utilities Company has been incorporated in Louisville with $2,000,000 capital stock by William R. Watson, Charles J. Ruebling and L. Earle Powell, all of Chicago. The company is permitted to operate street and interurban railways, to manufacture and sell electricity for light, heat and power purposes, also to engage in other business. It is reported in Louisville that the company may be used by H. M. Byllesby & Company, of Chicago, to acquire the property of the Louisville Railway in case the railway property should be purchased. The Louisville Lighting Company, which is owned by the Byllesby interests, has made a preliminary survey of the railway property in order to submit a proposal to furnish power for the operation of the lines and will complete this soon. One-fourth of the entire outstanding stock of the Louisville Railway is held by the estate of A. H. Davis.

**Lake Erie & Youngstown Railway, Youngstown, Ohio.**—The Public Service Commission of Ohio has refused permission to this company to issue $500,000 capital stock at 20 and the same amount of bonds at 80.

**New York (N. Y.) Railways.**—Supreme Court Justice Lehman has denied the application of the accident creditors' protective committee for an injunction to restrain the New York Railways from paying any interest on income bonds until provision has been made to issue bonds to persons holding accident claims of more than $500,000 against the Metropolitan Street Railway and the New York City Railway.

**Northwestern Railways, Meadville, Pa.**—The shareholders of the Northwestern Railways on Aug. 8 voted to increase the mortgage indebtedness of the company from $1,250,000 to $3,055,000 for the purpose of acquiring additional property and making improvements. The increase of the indebtedness is said to mean the purchase of the Meadville & Cambridge Springs Railway and the Erie Traction Company. The latter company operates between Cambridge Springs and Erie.

## Dividends Declared

Columbus (Ohio) Railway, quarterly, 1¼ per cent, common.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, one-half of 1 per cent, common.

## ELECTRIC RAILWAY MONTHLY EARNINGS

DALLAS ELECTRIC CORPORATION.

| Period | | | Gross Earnings. | Operating Expenses. | Net Earnings. | Fixed Charges. | Net Income. |
|---|---|---|---|---|---|---|---|
| 1m., | June, | '12 | $142,342 | *$87,607 | $54,735 | $24,666 | $30,069 |
| 1 " | " | '11 | 122,110 | *92,192 | 29,918 | 21,057 | 8,861 |
| 12 " | " | '12 | 1,709,020 | *1,105,418 | 603,602 | 259,852 | 343,750 |
| 12 " | " | '11 | 1,551,790 | *1,044,899 | 506,891 | 249,987 | 256,904 |

EL PASO ELECTRIC COMPANY.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | June, | '12 | $60,175 | *$32,860 | $27,316 | $6,464 | $20,852 |
| 1 " | " | '11 | 52,470 | *33,284 | 19,186 | 6,676 | 12,510 |
| 12 " | " | '12 | 730,169 | *408,389 | 321,780 | 82,125 | 239,655 |
| 12 " | " | '11 | 665,454 | *404,314 | 261,141 | 80,147 | 180,994 |

GALVESTON ELECTRIC COMPANY.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | June, | '12 | $43,032 | *$21,532 | $21,500 | $8,046 | $13,454 |
| 1 " | " | '11 | 43,830 | *23,269 | 20,561 | 6,861 | 13,700 |
| 12 " | " | '12 | 455,850 | *260,654 | 195,196 | 90,637 | 104,559 |
| 12 " | " | '11 | 407,854 | *236,361 | 171,493 | 83,601 | 87,892 |

GALVESTON-HOUSTON ELECTRIC COMPANY.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | June, | '12 | $171,085 | *$94,493 | $76,592 | $33,860 | $42,732 |
| 1 " | " | '11 | 134,934 | *83,577 | 51,357 | 19,034 | 32,323 |
| 12 " | " | '12 | 1,733,952 | *1,059,623 | 674,329 | 318,100 | 356,229 |
| 12 " | " | '11 | 1,416,149 | *888,417 | 527,732 | 243,976 | 283,756 |

NORTHERN TEXAS ELECTRIC COMPANY.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | June, | '12 | $144,975 | *$76,304 | $68,671 | $20,846 | $47,825 |
| 1 " | " | '11 | 136,062 | *72,763 | 63,299 | 20,757 | 42,542 |
| 12 " | " | '12 | 1,643,215 | *894,029 | 749,186 | 251,766 | 497,420 |
| 12 " | " | '11 | 1,540,192 | *850,481 | 689,711 | 226,332 | 463,379 |

PADUCAH TRACTION & LIGHT COMPANY.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 m., | June, | '12 | $21,817 | *$13,843 | $7,974 | $7,157 | $817 |
| 1 " | " | '11 | 20,648 | *13,047 | 7,600 | 6,640 | 960 |
| 12 " | " | '12 | 276,952 | *181,398 | 95,555 | 84,453 | 11,103 |
| 12 " | " | '11 | 256,850 | *155,122 | 101,728 | 76,174 | 25,554 |

PENSACOLA ELECTRIC COMPANY.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | June, | '12 | $23,946 | *$14,007 | $9,939 | $6,377 | $3,562 |
| 1 " | " | '11 | 24,742 | *15,107 | 9,635 | 4,975 | 4,660 |
| 12 " | " | '12 | 286,030 | *180,204 | 105,827 | 69,636 | 36,191 |
| 12 " | " | '11 | 284,165 | *175,022 | 109,143 | 56,963 | 52,180 |

SAVANNAH ELECTRIC COMPANY.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | June, | '12 | $65,016 | *$48,978 | $16,038 | $16,034 | $4 |
| 1 " | " | '11 | 59,928 | *44,611 | 15,317 | 15,306 | 11 |
| 12 " | " | '12 | 729,426 | *540,362 | 189,064 | 188,028 | 1,036 |
| 12 " | " | '11 | 662,047 | *478,112 | 183,935 | 182,751 | 1,184 |

TAMPA ELECTRIC COMPANY.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | June, | '12 | $61,874 | *$31,891 | $29,984 | $4,365 | $25,619 |
| 1 " | " | '11 | 56,813 | *32,692 | 24,121 | 5,397 | 18,725 |
| 12 " | " | '12 | 726,639 | *388,443 | 338,196 | 55,606 | 282,590 |
| 12 " | " | '11 | 615,365 | *345,963 | 269,402 | 57,685 | 211,717 |

*Includes taxes.

# Traffic and Transportation

## I. C. C. Suggests Readjustment of Fares by the Washington-Virginia Railway

The Interstate Commerce Commission handed down an opinion recently in the case against the Washington-Virginia Railway, Washington, D. C., in which the entire schedule of fares between Washington and points on the company's line in Virginia was claimed to be excessive, unreasonable and unduly discriminatory. In its opinion, which prescribed lower fares for the future, the commission said in part:

"The defendant operates a system of electric railways embracing a line extending from Twelfth Street and Pennsylvania Avenue, Northwest, Washington, D. C., via Arlington Junction, Clarendon and Falls Church, Va., to Fairfax, Va., a distance of 20.78 miles, hereinafter referred to as the Falls Church division, and a line extending from the same point via Arlington Junction and Alexandria, Va., to Mount Vernon, Va., a distance of 16.01 miles, hereinafter referred to as the Mount Vernon division. Both divisions use the same track from the Washington city terminal via the highway bridge to Arlington Junction.

"The fifty-two-trip ticket sold from the first to the fifth of each month on the Mount Vernon division is limited to the calendar month in which it is issued. This is also the case on the Falls Church division, but in addition the latter division sells tickets from the fifteenth to the seventeenth of each month, good until the fifteenth of the following month, which are accepted for travel on the Falls Church division to or from Washington only when an additional charge of 5 cents, or a District of Columbia street car ticket, is paid for each trip.

"Defendant issues twenty-five-trip monthly tickets, good for thirty days from date of issue, applicable between Washington and Alexandria, and twenty-five-trip family tickets, good for thirty days from date of issue, between Washington and points on the Falls Church division, with an additional 5-cent fare or a District of Columbia street car ticket.

"Complaint is made that special commutation fares are not maintained for the use of pupils who attend the schools in Washington city. For a number of years prior to October 10, 1902, special rates were published by the Washington, Alexandria & Mount Vernon Company for the use of pupils not over eighteen years of age who were actually attending grammar or high schools in Washington, but being advised that these rates as published were unlawful the company canceled them. There can be no question that said rates as published were unduly discriminatory. No sufficient reason is shown, however, why special commutation rates for young persons between certain ages should not be established, provided the rates are not limited to pupils of schools of any particular kind or class and do not exclude other persons between the same ages who travel under substantially similar transportation circumstances and conditions.

"It is contended that the life of the twenty-five-trip family ticket should be extended beyond thirty days, but the record discloses nothing to justify a holding that the existing limit is unreasonable. Tickets of this character are not available for travel between Washington and points on the Mount Vernon division. We are of the opinion that the same character of fares should be available to patrons of either division for substantially the same character of service. That is, if twenty-five-trip family tickets or fifty-two-trip commutation tickets are sold for travel to and from one station, the same character of tickets with substantially similar rates should be furnished for travel under like conditions to and from other stations. This same general principle applies to fares of other character.

"As to certain stations on the Falls Church division, the one-way and round-trip fares are considerably higher than the same character of fares for substantially similar distances on the Mount Vernon division. Defendant claims that the varying fares on the two divisions are the outgrowth of the former managements, and it is stated that the patrons do not want them changed. As to some of the fares we think there is just ground for complaint.

"The one-way fare between Washington and Mount Vernon is 40 cents, and the round trip 75 cents. It is averred that these fares are unreasonable, and also unduly discriminatory as compared with the fares between Washington and Miller, a station three-fourths of a mile nearer Washington. The Miller fares are 25 cents one way and 35 cents round trip. This wide difference in the fares for the very slight increase in distance defendant undertakes to justify on the theory that its fifty-two-trip commutation tickets which apply between Washington and Mount Vernon furnish a very low rate of transportation. But it is clear that these commutation rates do not place Mount Vernon on the same basis, relatively, with Miller as respects local travel. To get the benefit of such rates a patron is compelled to purchase a fifty-two-trip ticket, limited in its use to the calendar month in which it is issued, though the service required may not involve the half or quarter of that number of trips during the month.

"Defendant passenger fares are based upon a zone system. For the first zone on the Mount Vernon division a fare of 5 cents is charged. The fare is then increased as distance increases, on a basis of 5 cents for each zone to and including the zone in which Miller is situated. The next and last zone of the division extends for a distance of only three-fourths of a mile, and Mount Vernon, the terminus, is the only station within it. For this short distance defendant increases the one-way fare by the sum of 15 cents and the round-trip fare by 40 cents.

"It is true that the thousands of citizens who make the pilgrimage to Mount Vernon require the running of extra trains, but we apprehend that the service rendered is merely that which is necessary to accommodate traffic the carrier holds itself out to serve. The tourist movement to Mount Vernon comes after the so-called rush-hour movement to the city in the morning and is in the opposite direction from the heavy traffic in the afternoon.

"As has already been stated, the fares are graded up by zones with an increase of 5 cents in the fare for each zone. Upon this basis, to Miller, three-fourths of a mile nearer to Washington than is Mount Vernon, the one-way fare is 25 cents and the round-trip 35 cents. Upon the record we are of opinion and find that the fare to and from Mount Vernon on local trains should not exceed 30 cents for the one way and 45 cents for the round trip. For the service rendered by express trains, however, it is our conclusion that the rate should not exceed 35 cents one way and 60 cents for the round trip.

"It appears that certain one-way and round-trip fares of defendant to points on the Falls Church division are materially higher than the rates charged for substantially similar distances by the Washington, Baltimore & Annapolis company.

"Specific complaint is made of the one-way and round-trip fares between Fairfax and Washington. Fairfax is the terminus of the Falls Church division and is 20.78 miles from Washington. The one-way fare is 55 cents and the round-trip fare 85 cents. Upon consideration of all the facts of record we are of opinion and find that these fares are unreasonable, and that as to Fairfax and points in the same zone the fares should not exceed 50 cents one way or 80 cents for the round trip.

"We are also of opinion and find that between Washington and points on the Falls Church division intermediate between the zone in which West Falls Church is situated and the Fairfax zone the present one-way and round-trip fares are unreasonable. We find that as between Washington and the stations known as Robey, Antrim and Burr the fares should not exceed 25 cents one way or 40 cents for the round trip; that as between Washington and the stations known as Dunn Loring, Enola, Wedderburn, Woodford and Franklin the fares should not exceed 30 cents one way or 50 cents for the round trip; that as between Washington and the stations known as Vienna and Park Street the fares should not exceed 35 cents one way or 55 cents for the round trip; that as between Washington and the stations known as Library, Lewis Street, Bothwell and Five Oaks the fares should not exceed 40 cents one way or 60 cents for the round trip, and that as between Washington and the stations known as Edgela, Oakton and Sanger the fares should not exceed 45 cents one way or 70 cents for the round trip.

"Upon the hearing and in the briefs of counsel of both complainant and defendant the matter of the financial standing of defendant was gone into. Assuming that the amount of money actually invested in the property was $60,000 per mile, or $2,749,800 as a whole, the total cost would be only $371,500 more than the present outstanding stock. It would be $652,200 less than the present funded debt. For the period of two years prior to June 30, 1911, during which both divisions were operated free from control by the Washington, Arlington & Falls Church Company, the net annual operating revenues were $246,834.55 for the year ended June 30, 1911, and $258,780.65 for the year ended June 30, 1910, a yearly average of $252,807.60. The average yearly taxes amount to $29,325.05. This sum deducted from the average net operating revenue would leave $223,482.55, the equivalent of 6 per cent on a capitalization of $3,724,709, or $2,058,591 less than the outstanding capital on June 30, 1911. Upon the above showing the capitalization appears to be grossly excessive.

"We shall expect the defendant to readjust its tariff of fares in accordance with the views herein expressed. If this is not done on or before Aug. 1, 1912, we shall enter the necessary order to give effect to our conclusions."

## Radical Fare Ordinance in Portland, Ore.

The City Council of Portland, Ore., has passed several ordinances affecting the Portland Railway, Light & Power Company. These ordinances were designed to require the company to establish a 3-cent fare for all passengers required to stand, to operate owl cars from midnight to 6 a. m. and to fix a minimum charge for gas and electricity of 50 cents instead of $1 as at present. The ordinances have gone to Mayor Rushlight for his signature or veto.

B. S. Josselyn, president of the company, has issued a statement regarding these measures. Mr. Josselyn says: "The Portland Railway, Light & Power Company was organized six years ago. The first three years of its existence it paid no dividends upon its common stock. The first dividend paid on this stock was on Sept. 1, 1909, and then only 4 per cent was declared. In 1910 and 1911 4 per cent dividends were paid. This is a small return for the investment of the thousand or more stockholders scattered all over the Middle West. There is no 'water' in the stock and full value is represented. The capitalization is represented only by common stock.

"Through the agitation of a number of persons there is prevalent in this community the idea that the Portland Railway, Light & Power Company is making enormous profits. This is not true, as is evidenced in the dividend declared. In addition to paying this small dividend the property has been rebuilt, rehabilitated and extended at a cost of nearly $20,000,000 during the six years. These extensions, betterments and improvements have been built out of earnings and borrowed money, for which bonds have been issued. Every dollar of these bonds has been placed in the property.

"With this condition confronting the company it is a financial impossibility to adopt such a scheme as suggested in the 'no-seat-no-fare' ordinance. Eliminating the financial features, the proposition is full of operating difficulties which are of a character that will prevent efficient service. A half-fare ticket, with the understanding that everybody was to stand up for that fare, would lead to cars having their seating capacity filled being loaded to the guards. In other words, people would 'pass up' an empty car and wait for a loaded car so as to use their half-fare tickets. This would reduce the gross earnings to such an extent that a deficit would be created, which, of course, is contrary to the law. I believe the act is illegal, unreasonable and confiscatory."

**Smoking Prohibited on Cars in Texarkana, Tex.**—The City Council has passed an ordinance prohibiting smoking on cars on the Texas side. A similar ordinance was passed by the Council on the Arkansas side three weeks ago.

**Accident on Indiana Line.**—One person was killed and twelve passengers were injured when a car ran into an open switch on the Terre Haute, Indianapolis & Eastern Traction Company's line at Torr's Crossing, 5 miles west of Greencastle, Ind., at 4:45 p. m. on Aug. 15.

**Improvements in Des Moines.**—Charles F. Hewitt, general manager of the Des Moines (Ia.) City Railway, has announced that the company expects to expend $1,000,000 for improvements to its lines. The plan of the company includes re-routing of the lines, double-tracking, new carhouses and repair shops, new equipment, new cars and an expenditure of $100,000 on its power plant.

**Improved Service Requested on Old Loop in Columbus, Ohio.**—James Ross and other residents of the city filed a complaint with the Public Service Commission on Aug. 13 stating that the Columbus Railway & Light Company and the Ohio Electric Railway are not operating a sufficient number of cars over part of what is known as the old loop, embracing sections of Gay, Third, Rich and Scioto Streets.

**Seats for Conductors on Pay-As-You-Enter Cars in Louisville, Ky.**—The Louisville Railway has decided to provide seats for conductors upon its pay-as-you-enter cars where there is room for them. The experiment will be introduced at first on two lines. It is expected, however, that the plan will be extended in the near future so as to include the entire system of the company. The company provided seats for all its motormen some time ago.

**Salt Lake City Company Petitions for Ordinance to Prohibit Traffic in Transfers.**—The Utah Light & Railway Company has filed a petition with the city recorder asking the enactment of an ordinance prohibiting the sale, exchange, solicitation or giving away of street railway transfers and providing a penalty for any violation. Appended to the petition is an ordinance which the company seeks to have enacted. The proposed enactment makes a violation punishable by a fine of not less than $5 or more than $50.

**Accident Prevention Papers Issued in Bulletin Form by New York Electric Railway Association.**—The New York Electric Railway Association has issued in bulletin form three papers on the prevention of accidents which were presented at the thirtieth annual convention of the association at Saratoga Springs, N. Y., on June 26 and 27, 1912. The titles of the papers are as follows: "From the Legal Standpoint," by W. B. Baker, attorney Fonda, Johnstown & Gloversville Railroad; "From the Claim Agent's Standpoint," by James McPhillips, attorney Hudson Valley Railway; "From the Operating Standpoint," by James F. Hamilton, general manager Schenectady Railway.

**Heavy Traffic at Halifax, N. S.**—In connection with the recent visit of H.R.H. the Duke and Duchess of Connaught and the Princess Patricia to Halifax, the Halifax Electric Tramway Company, Ltd., handled nearly three times its normal traffic and about 2000 more than ever before in an equal time. On Aug. 14, the date of dedication of the Memorial Tower on the Northwest Arm, commemorating the establishment of independent colonial government, about 47,000 passengers were carried, including extra trips to the evening illuminations and to festivities in the heart of the city. During the evening the traffic of the whole city was focused upon the Spring Garden Road line, and despite the abnormal conditions the complete service was maintained.

**Wages Increased in Halifax, N. S.**—The Halifax Electric Tramway Company, Ltd., has announced increased rates of wages for employees and other new conditions dating from Aug. 1. The new schedule provides a rate of 20.5 cents per hour for motormen and conductors for the first year's service, 21.5 cents for the second year and 23.5 cents for the third and subsequent years. For Sunday work the corresponding rates are 24.5, 25.25 and 27.5 cents per hour. All time worked in excess of the regular scheduled run is to be paid for at the rate of 4 cents per hour above the regular scale of wages, and this provision also applies to the work of motormen and conductors in instructing new men. In the motor and truck repair department men who formerly received 17 cents per hour are to receive 19 cents; those who were rated at 20 cents will receive 22 cents, and those who received 22.5 cents are to be paid 23 cents. Armature winders are to receive 22 cents and car cleaners 18 cents per hour. Sweeper work is to be paid for at the 27-cent rate. Men who have served the company less than three years are to pay half the cost of their uniform and those who have been in the employ of the company three or more years are to receive their uniforms free.

# Personal Mention

**Mr. W. A. Flett** has succeeded Mr. F. F. Mahoney as roadmaster of the Peoria (Ill.) Railway.

**Mr. Herbert E. Reade** has succeeded Mr. S. L. Kelley as claim agent of the Richmond & Henrico Railway, Richmond, Va.

**Mr. L. S. Riess** has succeeded Mr. W. R. Lewis as secretary and treasurer of the Alexandria (La.) Electric Railways.

**Mr. W. P. Thomas** has succeeded Mr. A. W. Gross as claim agent of the Omaha & Council Bluffs Street Railway, Omaha, Neb.

**Mr. J. E. Lebon** has succeeded Mr. R. E. Harris as purchasing agent of the Knoxville Railway & Light Company, Knoxville, Tenn.

**Mr. H. P. Lewis** has succeeded Mr. James Lawrence as auditor of the Muskegon Traction & Lighting Company, Muskegon, Mich.

**Mr. A. B. Metcalf** has succeeded Mr. C. V. De Jong as master mechanic of the Auburn & Northern Electric Railroad, Auburn, N. Y.

**Mr. J. S. Lloyd** has been appointed master mechanic of the Santa Barbara (Cal.) Consolidated Railroad to succeed Mr. S. W. Thom.

**Mr. Archibald McGillivray** has succeeded Mr. Ralph Carman as comptroller of the West India Electric Company, Ltd., Kingston, Jamaica.

**Mr. M. T. Caldwell** has succeeded Mr. L. W. Bolts as secretary and treasurer of the Jackson Railway & Light Company, Jackson, Miss.

**Mr. Joseph Morse** has succeeded Mr. E. Rondeau as roadmaster of the Milford, Attleboro & Woonsocket Street Railway, Milford, Mass.

**Mr. C. E. Fletcher** has succeeded Mr. G. Malloney as master mechanic of the San Angelo Power & Street Railway Company, San Angelo, Tex.

**Mr. George D. Hegarty** has succeeded Mr. L. G. Whipple as secretary of the Waterville, Fairfield & Oakland Railway, Waterville, Maine.

**Mr. E. P. Shanks** has succeeded Mr. J. H. Hibbard as chief engineer of the power station of the People's Traction Company, Galesburg, Ill.

**Mr. Thomas E. Bryant** has succeeded Mr. J. T. Maher as chief engineer of the power station of the Richmond & Henrico Railway, Richmond, Va.

**Mr. E. Brown** has succeeded Mr. J. F. Shreffler as engineer of the power station of the Chicago & Milwaukee Electric Railroad, Highwood, Ill.

**Mr. M. M. Miles** has succeeded Mr. W. Stewart as purchasing agent of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.

**Mr. E. H. Elwin** has been elected secretary of the Wahpeton-Breckenridge Street Railway, Breckenridge, Minn., to succeed Mr. D. J. Jones.

**Mr. J. W. Hungate** has succeeded Mr. G. W. Northrop as chief engineer of the power station of the Spokane & Inland Empire Railroad, Spokane, Wash.

**Mr. H. G. Hetzler** has succeeded Mr. A. Anweiler as superintendent of the Piqua city lines of the Dayton & Troy Electric Railway, Dayton, Ohio.

**Mr. W. D. Dwyer** has succeeded Mr. E. E. Watson as claim agent of the St. Paul division of the Twin City Rapid Transit Company, Minneapolis, Minn.

**Mr. J. G. Morgan** has been appointed assistant treasurer, auditor and purchasing agent of the New York & North Shore Traction Company, Roslyn, N. Y., to succeed Mr. G. Franklin Smith.

**Mr. James F. Shaw,** past-president American Electric Railway Association and president Long Acre Electric Light & Power Company, New York, was married Aug. 22 in Brooklyn to Miss Lois Kenyon.

**Mr. N. A. Miner** has succeeded Mr. J. C. Whitney as chief engineer of the power station of the Springfield & Northeastern Traction Company, Riverton, Ill., which is part of the Illinois Traction System.

**Mr. A. Schwartz** has been appointed engineer of maintenance of way of the Toledo Railways & Light Company, Toledo, Ohio, to succeed Mr. H. D. Sanderson, who resigned to become connected with the Michigan United Traction Company as engineer of maintenance of way.

**Mr. H. J. Vance,** purchasing agent of the Illinois Traction System and the Western Railways & Light Company, has succeeded Mr. W. A. Martin as purchasing agent of the Galesburg Railway & Light Company, Galesburg, Ill., the property of which is owned by the Western Railways & Light Company.

**Mr. John M. Scott** has resigned as chief of the inspection department of the Indiana Railroad Commission to become connected with the Baltimore & Ohio Railroad. Mr. Scott began his railway career as a telegrapher. He was connected with the Cincinnati, Hamilton & Dayton Railroad and later with the Kansas City Southern Railway.

**Mr. Robert A. Foresman** has been appointed superintendent of motive power of the Des Moines (Ia.) City Railway. Mr. Foresman for the past six years was chief engineer of the power plant of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. He will be succeeded in St. Joseph by Mr. John Elftman, who was assistant engineer of the power station.

**Mr. Bert L. Jones,** who has been treasurer and general manager of the Lewiston & Youngstown Frontier Railway, Lewiston, N. Y., has been elected vice-president and general manager of the company, and Mr. Robert E. Powers, who has been secretary of the company, has been elected secretary and treasurer. Mr. Jones, who has also been treasurer and general manager of the Niagara Gorge Railroad, Niagara Falls, N. Y., has been elected vice-president and general manager of the company, and Mr. Powers, who has been secretary of the company, has been elected secretary and treasurer.

**Mr. C. F. Dege** has recently been appointed general superintendent of the Iowa & Illinois Railway, Davenport, Ia., in charge of operation. This is a new position, the office of superintendent of transportation having been abolished. Mr. Dege entered the employ of the Iowa & Illinois Railway in the fall of 1904 as a passenger conductor. On Aug. 28, 1911, he was chosen to succeed Mr. Richard Damrow as superintendent of transportation. When the position of superintendent of transportation was abolished and the office of general superintendent was created Mr. Dege was appointed to the latter office.

**Mr. E. S. Fassett,** who recently resigned as general manager of the United Traction Company, Albany, had a complimentary dinner tendered to him on the evening of Aug. 19 at the Claremont Hotel, New York. About forty of Mr. Fassett's friends were present. They included many railway men from central New York, former associates with him in the activities of the New York Electric Railway Association. J. H. Pardee, vice-president J. G. White & Company, Inc., acted as toastmaster, and all present wished Mr. Fassett abundance of success in the new enterprise of manufacturing auto-trucks for electric railway lines in which he is now engaged.

**Mr. H. Tully Bostick,** assistant general passenger agent of the Northern Texas Traction Company, Fort Worth, Tex., has been appointed general passenger agent of that company and general passenger agent of the Fort Worth Southern Traction Company. Mr. Bostick has been with the company since 1904. He began as night ticket clerk, while still a student at the Fort Worth High School. In the summer vacation he worked in the accounting department of the company. After he graduated he was made city ticket agent and the three hours he had off during the day he used in studying at the Fort Worth University. In August, 1910, he was appointed assistant passenger agent. Mr. Bostick is secretary of the Fort Worth Ad Club and is a member of the Fort Worth Chamber of Commerce.

**Mr. Jules de Fischer,** chief electrical engineer Budapest Local Railway Company, and Mr. Marcell Jellinek, electrical engineer, Budapest, arrived in this country on Aug. 20 for a tour of about six weeks to inspect the suburban

and interurban electric railway systems in the Eastern and Central States. The Budapest Local Railway, with which these gentlemen are connected, is a large suburban and interurban railway system serving the city of Budapest and neighboring cities and is equipped with the 1200-volt system. It was described at length in an article by Mr. de Fischer in the ELECTRIC RAILWAY JOURNAL for June 1, 1912. Among its other novel features it is equipped with a catenary with a compensating device for changes in temperature to keep in alignment the working conductor. The device was invented by Messrs. de Fischer and Jellinek.

**Mr. Ray W. Reynolds** has been appointed general manager of the Hartford & Springfield Street Railway, Warehouse Point, Conn., to succeeed Mr. H. S. Newton, whose appointment with the Mesaba Railway was noted in the ELECTRIC RAILWAY JOURNAL of Aug. 17, 1912. Mr. Reynolds entered railway work in 1902 with the construction department of the Indianapolis & Northwestern Traction Company, which was then building an electric railway from Indianapolis, Ind., to Lafayette and from Lebanon to Crawfordsville, Ind. After the line was completed he continued with the company and worked through all the departments. In January, 1907, he was appointed superintendent of the company's line, which is now the Northwestern division of the Terre Haute, Indianapolis & Eastern Traction Company. In August, 1908, he was appointed general superintendent of the Chicago, South Bend & Northern Indiana Railway and of the Southern Michigan Railway, with headquarters at South Bend, Ind. In 1910 Mr. Reynolds was elected vice-president and general manager of the American Light & Water Company, Chicago, Ill., building electric light and water works systems. He resigned from the last-named company to become general manager of the Hartford & Springfield Street Railway.

**Mr. M. H. Bronsdon** has resigned as chief engineer of The Rhode Island Company, Providence, R. I., to take effect Sept. 1, and intends then to return to his home in California. Mr. Bronsdon's latest work in Providence has been the erection of the new 15,000-kw Manchester Street power station, described in the ELECTRIC RAILWAY JOURNAL for Sept. 23, 1911. This work is now completed. Mr. Bronsdon commenced his railway career in the operating and construction departments of the Los Angeles Railways. In April, 1889, he went to Denver as superintendent of the Denver Tramway Company, now a part of the Denver City Tramway Company. In November, 1889, he resigned to accept a similar position with the Union Railroad Company, Providence, R. I., remaining in Providence until 1902, during which time he constructed a short cable line on College Hill. In 1904 he was associated with the Old Colony Street Railway Company of Boston on general street railway operations, and in the following year was appointed chief engineer of the United Railroads of San Francisco. He remained with this company for two years and was associated with it during the famous earthquake, fire and strike, at which time he took an active part in protecting the property. In 1907 he returned to Providence as chief engineer of The Rhode Island Company. Mr. Bronsdon has always been prominent in association work and each time when in New England has held office in the New England Street Railway Club.

## OBITUARY

**Paul t'Serstevens,** secretary general of the International Street & Interurban Railway Association, died Aug. 8 at Aix-la-Chapelle, where he was under treatment for illness which did not seem to be serious. Mr. t'Serstevens had just returned from the convention of the International Street & Interurban Railway Association at Christiania, Norway, where he appeared to be not in his usual good health, but his friends did not anticipate a fatal termination of his illness. Mr. t'Serstevens has been secretary general of the International Street & Interurban Railway Association since 1901, when he succeeded Mr. Nonnenberg, of Brussels. Mr. t'Serstevens was also a resident of Brussels, and his administration of the affairs of his office was marked by characteristic precision and energy. Notice of Mr. t'Serstevens' death has been issued to the members of the association by the newly elected president, C. de Burlet, general manager of the National Light Railway Company of Belgium.

# Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

## RECENT INCORPORATIONS

**Mobile (Ala.) Interurban Railway.**—Incorporated in Alabama to build a 2-mile electric railway from the terminus of the Spring Hill line of the Mobile Light & Railroad Company to Pinehurst and to connect at the other end with the Dauphin Street line. Surveys of the route have been completed. Capital stock, $5,000. Officers: James A. Lewis, president; V. Shoub, vice-president and general manager, and J. D. Atkins, secretary and treasurer. [E. R. J., April, 6, '12.]

***Carolina & Georgia Railway, Augusta, Ga.**—Application for a charter has been made in South Carolina by this company to build an electric railway to connect Leesville, Batesburg, Hibernia, Vaucluse, and either Warrenville or Graniteville. James U. Jackson, Augusta, vice-president of the Augusta-Aiken Railway, is interested.

***Mason City & Osage Railway, Mason City, Ia.**—Incorporated in Iowa to build an interurban railway from Mason City through Cerro Gordo, Worth and Mitchell Counties. Capital stock, $25,000. Frank O'Connor, New Hampton, president.

***Ardmore Western Interurban Railway, Ardmore, Okla.**—Chartered in Oklahoma to build a 100-mile electric railway from Ardmore northwest through Carter, Jefferson and Love Counties and a branch from Springer north into Murray County. Capital stock, $300,000. Incorporators: J. S. Owens, D. E. Allen, T. C. Bridgeman, W. R. Burnett, C. B. Kendrick and R. A. White, Ardmore, and J. L. Jordan, Marietta.

***Irwin, Claridge & Export Railway, Irwin, Pa.**—Application for a charter has been made in Pennsylvania by this company to build a 10-mile electric railway to connect Pittsburgh, Shafton, Westmoreland City, Claridge, Harrison City and Boquet. It will connect with the Pittsburgh, McKeesport & Greensburg Electric Railway.

**Jefferson County Traction Company, Beaumont, Tex.**—Incorporated in Texas to build an electric railway between Beaumont and Port Arthur. This line will be built by the Stone & Webster Corporation. Headquarters, Beaumont. Capital stock, $600,000. Among the incorporators are: Marshall M. Phinney and Theodore T. Whitney, Jr., Boston. [E. R. J., Aug. 17, '12.]

***Seattle-Tacoma-Olympia Railway, Seattle, Wash.**—Application for a charter has been made in Washington by this company to build an interurban railway to connect Seattle, Tacoma and Olympia. Capital stock, $1,500,000. Headquarters, Seattle. Incorporators: I. M. Howell, Seattle; W. D. Hall, J. S. Wheeler and S. L. Cravens.

## FRANCHISES

**Berkeley, Cal.**—The San Francisco, Oakland & San José Railway has received a franchise from the Council for lines on Euclid Avenue and Eunice Street in Berkeley.

**Sacramento, Cal.**—The Vallejo & Northern Railway has asked the City Commissioners for a forty-seven-year franchise over Front Street from R to M Street in Sacramento.

**New London, Conn.**—The New London & East Lyme Railway has petitioned Judge Ralph Wheeler of the Superior Court to grant permission to construct an extension from Flanders Corners to the Connecticut River, at the Connecticut River bridge.

**East St. Louis, Ill.**—The Southern Traction Company has asked the Council for a franchise to extend its lines on Fourth Street and on Tenth Street from Market Street to the east approach of the Municipal Bridge in East St. Louis.

**Louisville, Ky.**—The fiscal court of Jefferson County will probably grant a franchise to the Louisville & Interurban Railroad for the operation of a double-track line over the Shelbyville pike from the city limits to St. Matthew's, Ky., 1 mile east of the city.

**Worcester, Mass.**—The time within which the Worcester & Providence Street Railway is authorized to construct and

operate its railway has been extended to Jan. 1, 1913, by an order of the Railroad Commission.

**St. Joseph, Mo.**—The St. Joseph Railway, Light, Heat & Power Company has asked the Council for a franchise to extend its Jule Street line in St. Joseph.

**Mohawk, N. Y.**—The Utica & Mohawk Valley Railway, Utica, has asked the Council for a franchise for one additional track, making a double-track line from the westerly line of Ilion to the westerly line of German Flats.

**Columbus, Ohio.**—The Columbus Railway & Light Company has received a franchise from the County Commissioners to extend its double track in Cleveland Avenue, Columbus, to the north corporation line of Linden Heights.

**Granby, Que.**—The Montreal & Southern Counties Railway, Montreal, Que., has received a twenty-five-year franchise from the Council of Granby, Que. The company intends shortly to begin construction on the extension of its lines through Granby.

**Regina, Sask.**—The City Council has under consideration a proposition to build a 6-mile line to open up new territory and hand it over to the city. The Council has asked the promoters to submit proposals for the operation and maintenance of the line pending the development of the property.

**St. Elmo, Tenn.**—The Chattanooga Railway & Light Company has asked the Commissioners for a franchise in St. Elmo. The company has received a franchise from the County Court in St. Elmo.

**Corpus Christi, Tex.**—The Council has granted the Corpus Christi Traction Company a franchise for a street railway in Corpus Christi. [E. R. J., April 27, 1912.]

**Waxahachie, Tex.**—The Southern Traction Company, Dallas, has received a franchise from the City Council in Waxahachie.

## TRACK AND ROADWAY

**Birmingham & Chattanooga Railroad, Birmingham, Ala.**—Announcement has been made by this company that it has completed its surveys and obtained the right-of-way for its 147-mile electric railway to connect Birmingham, Oneonta, Boaz, Henegar and Chattanooga. Arrangements have been made to secure power in Chattanooga. J. W. Spradlin, president. [E.R.J., June 15, '12.]

**Warren-Bisbee Railway, Warren, Ariz.**—Work has been ordered to be begun at once by this company on its extension up Tombstone Canyon.

**International Railway & Development Company, Vancouver, B. C.**—Application is being made by this company for license to store 5000 ft. of water in the Fraser River above the town of Yale, B. C., for power purposes. This company intends to build an electric railway through the lower mainland of British Columbia, connecting New Westminster with Ladner, thence through Delta and Surrey, B. C., to Blaine and Huntingdon, Wash. H. T. Thrift, Hazelmere, B. C., secretary. [E. R. J., July 20, '12.]

**Los Angeles (Cal.) Electric Railway.**—Plans are being made by this company to extend its South Main Street line as far south as Slauson Avenue in Los Angeles.

**Central California Traction Company, San Francisco, Cal.**—Work will be begun by this company at once to double-track its line in X Street from Twenty-second Street to Twenty-eighth Street in Sacramento.

**Geary Street Municipal Railway, San Francisco, Cal.**—The Board of Public Works has approved the plans and specifications as prepared by Assistant City Engineer W. M. Larned for the construction of this railway on the two blocks on Market Street from Geary and Kearney Streets to Sansome Street, where it is intended to make connection with the outer tracks which have been used by the cars of the Sutter Street line in San Francisco.

**Stockton Terminal & Eastern Railroad, Stockton, Cal.**—Material has been received by this company for the construction of its extension from Stockton to Bellota. Grading has been completed between the end of the line, just beyond Linden, and Bellota

**Watsonville Railway & Navigation Company, Watsonville, Cal.**—Plans are being made by this company to build an extension from Watsonville into the San Joaquin Valley.

***Wendall, Idaho.**—J. W. Crowley, of the Crowley-Salisbury Construction Company, Davenport, Ia., and J. Stewart Clark, Buffalo, N. Y., plan to build a 15-mile electric railway between Wendall and Hagerman.

**Decatur, Sullivan & Mattoon Transit Company, Mattoon, Ill.**—Right-of-way has been obtained, financial backing secured and work will soon be begun by this company on its 48-mile electric railway to connect Sullivan, Decatur and Mattoon. [E. R. J., Nov. 26, '12.]

**East Chicago (Ind.) Street Railway.**—This company has increased its capital stock from $100,000 to $490,000. It was recently incorporated to build an electric railway to connect several cities in the Calumet region. T. C. Pierson, East Chicago, is interested. [E. R. J., Aug. 10, '12.]

**Evansville (Ind.) Railways.**—This company has placed in operation its line between Evansville and Henderson. The original plan of transferring interurban cars across the river has not been begun on account of inability to complete the inclined tracks on the Indiana side out into the river because of the excessive high water at this season of the year.

**Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.**—Double track will be built at once by this company between South Bend and Mishawaka.

**Creston, Winterset & Des Moines Railroad, Creston, Ia.**—This company has awarded the contract for grading the right-of-way between Creston and Macksburg to J. F. Buis, E. P. Olson and T. L. Campbell. Work will be begun at once. R. Brown, Creston, president. [E. R. J., Oct. 28, '12.]

***Central City, Ky.**—J. A. Rose, Central City, is organizing a company to construct a line between Central City and Greenville, Ky. It is planned to erect a power house at Dovey, Ky. It is intended to serve a number of coal mines which are electrically operated. The ultimate terminals of the line are to be Owensboro and Henderson, Ky.

**Kentucky Southwestern Electric Railway, Light & Power Company, Hickman, Ky.**—This company, which plans to build a line from Paducah to Mayfield, has completed surveys of the line and reports having secured rights-of-way for the entire distance. Terminals in Paducah are to be located in the immediate future. W. A. Calhoun is consulting engineer. [E. R. J., Aug. 17, '12.]

**Algiers Railway & Lighting Company, Algiers, La.**—Work has been begun by this company on its extension along Patterson Street in Algiers.

**Aroostook Valley Railroad, Presque Isle, Maine.**—This company has awarded the contract for the construction of a 6-mile extension between Deadwater and Caribou to L. A. Gould.

**Boston & Eastern Electric Railroad, Boston, Mass.**—The Board of Railroad Commissioners has issued an order fixing the route of this railway through Lynn, the route being that which has been known as the tunnel route under Lynn Common.

**Plymouth & Sandwich Street Railway, Manomet, Mass.**—At the annual meeting of the directors of this company it was definitely determined not only to construct this line from Fresh Pond to Sagamore and carry it as far as the Sandwich-Bourne boundary, but to build it 5 miles farther and connect at Buzzard's Bay station on the line of the New York, New Haven & Hartford Railroad with the New Bedford, Middleborough & Onset Street Railway.

**Berkshire Street Railway, Pittsfield, Mass.**—The State Railroad Commission has approved this company's petition for the extension from Lee to Blandford.

**Meridian Light & Railway Company, Meridian, Miss.**—Plans are being made by this company for the extension of its Eighth Street lines to Oakland Heights, a distance of 1 mile.

**Billings (Mont.) Traction Company.**—Track laying has been begun by this company for its new line west on First Avenue north to Division Street and thence west on Broadwater and Fourth Street in Billings.

**Moncton Tramways, Electricity & Gas Company, Ltd., Moncton, N. B.**—This company plans to begin work at once on the completion of the city street railway system in

Moncton and will utilize the Moncton & Buctouche Railway track to Humphrey's Mills for suburban service.

**Public Service Railway, Newark, N. J.**—The Trenton Terminal Railway, a subsidiary of this company, has awarded a contract for the construction of an electric railway to connect Elizabeth and Trenton, establishing a short line between New York and Philadelphia, to the J. F. Shamley Company, Newark, N. J.

***Middletown, Ohio.**—Joseph Brinkman, Cincinnati, and others have raised $500,000 capital to start construction of a 35-mile electric railway from Norwood to Middletown.

**Dayton & Troy Electric Railway, Tippecanoe City, Ohio.**—During the next few weeks this company will place contracts to build 2 miles of second track.

**Oklahoma City (Okla.) Traction Company.**—Work has been begun by this company on the construction of 18 miles of single track which will include practically all of the principal streets of the southern part of Oklahoma City.

**Sand Springs Interurban Railway, Tulsa, Okla.**—Plans have been completed by this company for the construction of the extension to Oologah, via Collinsville, a distance of 30 miles.

**Berlin & Northern Railway, Berlin, Ont.**—This company is now building an 800-ft. extension of its line in Bridgeport.

**Berlin & Waterloo Street Railway, Berlin, Ont.**—The Council of Berlin will vote on Aug. 31 on five proposed by-laws. One of the by-laws will be for $6,000 to defray a portion of the cost for erecting a county bridge across Grand River at Bloomingdale for the Berlin & Northern Railway.

**Nipissing Central Railway, Cobalt, Ont.**—The Minister of Railways has approved of a route map for the extension of the line from Haileybury to New Liskeard, Ont., a distance of 5.5 miles.

**Port Arthur & Fort William Electric Railway, Port Arthur, Ont.**—Surveys have been made and a by-law will be submitted for a 10-mile belt line in Port Arthur. The City Council has decided to call for bids for the supply of necessary material for constructing a line on Pacific Avenue in Fort William.

**St. Thomas (Ont.) Street Railway.**—The city engineer has been directed by the Council to prepare an estimate for extending the street railway from Hemlock Street to Pinafore Park, and to place the track now laid in the park in a condition for traffic.

**Toronto, Ont.**—The Board of Railway Commissioners has approved of the revised location plans for the line of the Toronto & Eastern Railway through Pickering, Ont. This line is under construction from Bowmanville to Toronto, together with a branch line into Oshawa, Ont.

**Oregon Electric Railway, Portland, Ore.**—Work has been begun by this company clearing the right-of-way and grading near Corvallis.

**Portland, Eugene & Eastern Railway, Portland, Ore.**—This company has awarded a contract to the Flagg & Standifer Company for the construction of 25 miles of track on its Monroe-Eugene line.

**Portland, Ore.**—Fred A. Jacobs has asked for a permit to construct the Errol Heights Railway, which is to be a short line from Errol Heights to connect with the lines in Portland. [E. R. J., April 27, '12.]

**Salem, Ore.**—The Portland, Eugene & Eastern Railway, Portland, has received a thirty-five-year franchise from the Council in Salem.

**Bloomsburg, Millville & Northern Railway, Bloomsburg, Pa.**—This company has recorded first mortgage bonds for $150,000 at Bloomsburg. This amount will be used to construct and equip this line between Bloomsburg and Millville. It is announced that the company will operate storage battery cars.

**Westside Electric Street Railway, Charleroi, Pa.**—Grading has been begun by this company at Bentleyville for an extension from Charleroi to Ellsworth.

**Irwin-Herminie Traction Company, Irwin, Pa.**—This company plans to begin at once to construct its extension to Madison and Yukon.

**Pittsburgh, McKeesport & Greensburg Railway, McKeesport, Pa.**—It is reported that this company will soon begin work on its extension from Pittsburgh to McKeesport, via Jacksonville and Circleville, to connect with its Tube City division at Bryn Mawr. The company has surveyed for a loop from Pittsburgh to Herminie and for a high-speed line to Greensburg.

**Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.**—Surveys are being made by this company for the extension to East Butler.

**Montreal & Southern Counties Railway, Montreal, Que.**—The Minister of Railways has approved of the route map for the proposed line from Ranelagh to Laprairie, Que., a distance of 4 miles.

**Austin (Tex.) Electric Railway.**—Plans are being made by this company to locate definitely the center line of the Dam Boulevard from the International & Great Northern Railroad westward to the dam, a distance of something like 2 miles. Construction will soon be begun.

**Dallas Southern Traction Company, Dallas, Tex.**—This company announces that it will place its 30.9-mile electric railway between Dallas, Lisbon, Lancaster, Red Oak, Kenwood, Sterrett and Waxahachie in operation the first week in September. Edward T. Moore, general manager. [E. R. J., July 13, '12.]

**Rutland Railway, Light & Power Company, Rutland, Vt.**—The extension of this company's line from Poultney to Granville will be begun at once.

**Wellsburg, Bethany & Washington Traction Company, Wellsburg, W. Va.**—This company has recently placed a contract to move its track in Bethany to the middle of the street and pave the same with brick.

## SHOPS AND BUILDINGS

**Sioux City (Ia.) Service Company.**—During the next six weeks this company will award contracts to build a new carhouse in Sioux City.

**Berlin & Waterloo Street Railway, Berlin, Ont.**—This company expects to build an addition to its carhouses as soon as the by-law for raising the necessary money has been passed.

**Pittsburgh (Pa.) Railways.**—This company plans to build a new passenger and freight depot on McKean Avenue, in Donora. Bids are being asked by the company to build a sand, oil and stock house at Emsworth. The structure will be 42 ft. x 49 ft. and of brick construction. Plans for the work have been prepared by F. Uhlenhart, Jr.

**Wheeling (W. Va.) Traction Company.**—Work will soon be begun by this company on its new carhouse in North Warwood. It will be used for the Panhandle and Benwood cars.

## POWER HOUSES AND SUBSTATIONS

**Alabama Traction, Light & Power Company, Montgomery, Ala.**—The Alabama Interstate Power Company, which is a subsidiary of the Alabama Traction, Light & Power Company, has awarded contracts for the construction of its first hydroelectric development on the Coosa River, 42 miles from Birmingham. The contract provides for the construction of a dam 1,500 ft. in length, at which will be installed four electric generating units of 15,000 hp each. The plans of the company provide for the ultimate increase of its generating capacity to 400,000 hp.

**Muskegon Traction & Lighting Company, Muskegon, Mich.**—A contract has been made whereby this company will obtain its power from the Grand Rapids-Muskegon Power Company in the future.

**Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.**—This company has let a contract for the installation of 6000 hp additional generating equipment for its Elyria power house.

**Western Ohio Railway, Lima, Ohio.**—A contract has been let by this company for a new 4000-kw General Electric turbo-generator to be installed at its power hose in Lima.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—During the next few weeks this company will place contracts to build two new substations on its Weston extension, each to be equipped with one 300-kw rotary converter and other necessary equipment.

# Manufactures and Supplies

## ROLLING STOCK

**Des Moines (Ia.) City Railway** expects to purchase fifteen pay-as-you-enter cars for Dec. 1 delivery.

**Freeport Railway & Light Company, Freeport, Ill.,** it is reported, will purchase several new cars.

**Birmingham (Ala.) Railway, Light & Power Company** is in the market for several motor and trail cars.

**Connecticut Company, New Haven, Conn.,** has ordered four dump cars from the Wason Manufacturing Company.

**Indianapolis Traction & Terminal Company, Indianapolis, Ind.,** has ordered twenty-five cars from the Cincinnati Car Company.

**Auburn & Syracuse Railroad, Syracuse, N. Y.,** has ordered three single-truck car bodies from the G. C. Kuhlman Car Company.

**Milford, Attleboro & Woonsocket Street Railway, Milford, Mass.,** has ordered one snow plow from the Wason Manufacturing Company.

**Saskatoon (Sask.) Municipal Street Railway** has ordered twelve single-truck cars from the St. Louis Car Company through Stone & Webster, Boston, Mass.

**Rockland, Thomaston & Camden Street Railway, Rockland, Maine,** expects to purchase one double-truck combination snow plow, freight and passenger car; also two double-truck semi-convertible cars.

**Illinois Traction System, Peoria, Ill.,** has ordered three double-truck semi-steel city car bodies from the St. Louis Car Company for use in Champaign. The cars are of the steel-post construction, 28 ft. over corner posts and 41 ft. over all. They will be mounted on St. Louis No. 99 single-motor trucks.

**Metropolitan Street Railway, Kansas City, Mo.,** has prepared designs for twenty-five new vestibuleless cars, but they have not as yet been passed upon by the receivers of the company. The cars will be 48 ft. long and will seat fifty-six persons. They will be duplicates of the cars purchased by the company last year.

**New York State Railways, Rochester, N. Y.,** reported in the Electric Railway Journal of Aug. 10, 1912, as being in the market for twenty cars, has ordered from The J. G. Brill Company twenty 30-ft. 11-in. pay-as-you-enter motor-car bodies mounted on Brill 39-E trucks. The cars will weigh 38,000 lb. and will be equipped with Westinghouse motors and air brakes.

**Elmira Water, Light & Railroad Company, Elmira, N. Y.,** noted in the Electric Railway Journal of Aug. 3, 1912, as having ordered eight semi-convertible prepayment cars through W. R. Kerschner from the Cincinnati Car Company, has specified details for this equipment according to the following statement:

| | |
|---|---|
| Seating capacity.....46 | Curtain material...Pantasote |
| Length of body.....33 ft. | Destination signs.....Hunter |
| Length over vestibule..45 ft. | Gongs .....Dedenda |
| Width over sills....8 ft. 4 in. | Hand brakes.....Peacock |
| Width over all.....8 ft. 8 in. | Heaters .....Consol. |
| Sill to trolley base, 8 ft. 10¼ in. | Headlights ....Crouse-Hinds |
| | Sanders .....O. B. |
| Body .....wood | Sash fixtures.....Dayton |
| Interior trim.....cherry | Seats .....H. W. |
| Headlining .....agasote | Seating material.....rattan |
| Roof, type.....arch | Step treads.....Mason |
| Underframe .....composite | Ventilators .....Cincinnati |
| Bumpers. Hedley anti-climber | Wheels .....33 in. |
| Car trimmings.....bronze | Special devices..Van Dorn & Dutton track scrapers |
| Couplers....Cincinnati radial | |
| Curtain fixtures.....Forsythe | |

Four of these cars are equipped with Standard O-45 trucks and longitudinal seats and four with Standard C-50 trucks and cross seats.

## TRADE NOTES

**Cambria Steel Company, Johnstown, Pa.,** has elected Alexander P. Robinson a director to succeed Frederick Krebs, resigned.

**Westinghouse Traction Brake Company, Pittsburgh, Pa.,** has moved its Chicago offices from 1545 Railway Exchange Building to 827 Railway Exchange Building.

**National Brake & Electric Company, Milwaukee, Wis.,** has removed its Chicago offices from 1545 Railway Exchange Building to 827 Railway Exchange Building, where commodious and improved facilities have been provided for handling its business in this territory.

**Root Spring Scraper Company, Kalamazoo, Mich.,** announces that the United Traction Company, Albany, N. Y., has just placed an order with it for sixty-five scrapers. This shipment will make a total of about 500 Root spring scrapers that are in use on cars owned by this company.

**American-La France Fire Engine Company, Elmira, N. Y.,** through Swartwout & Appenzellar as fiscal agents, has submitted to its bondholders and stockholders a plan of reorganization. The company has a floating indebtedness of about $450,000, made necessary by the change in demand from horse-drawn to motor fire apparatus. Under the reorganization plan, present bondholders will receive 100 per cent in new 7 per cent preferred stock and 33 1/3 per cent in new common stock; preferred stockholders will receive 50 per cent in new 7 per cent preferred and 33 1/3 per cent in new common; common stockholders will receive 30 per cent in new common.

**Bethlehem Steel Company, Bethlehem, Pa.,** announces that work has begun on the construction of six additional open-hearth steel furnaces of seventy-five tons capacity each, to be added to the Sancon department. This will increase the output of the plant to 75,000 tons of steel ingots a month. Other additions to be made to the plant include extensions to steel buildings, installation of hot metal mixers, large electrical cranes and other equipment. All the capacity of the new furnaces will be put on Bethlehem and standard structural steel shapes and open-hearth rails. The drop forge department will be considerably enlarged by the construction of a new warehouse and a treating and finishing department. Contracts have been let for additions to the general office and armor-plate office at South Bethlehem.

**T. H. Symington Company, Baltimore, Md.,** has issued a circular which announces the appointment of S. L. Kamps as general manager in charge of operations and manufacturing, with office at Rochester, N. Y. Mr. Kamps became associated with the Symington Company in May, 1910, being elected to the office of assistant secretary, and later, on the death of E. John Nichols, succeeded to the office of secretary. Mr. Kamps, immediately preceding his connection with the Symington Company, was assistant to the president of the Seaboard Air Line Railway at Norfolk, Va., which place he resigned to join the Symington organization, and his experience in railroad service on the Philadelphia & Reading Railway, Lehigh Valley Railroad and Queen & Crescent system, as well as on the Seaboard Air Line, qualifies him to assume the duties of his new position.

## ADVERTISING LITERATURE

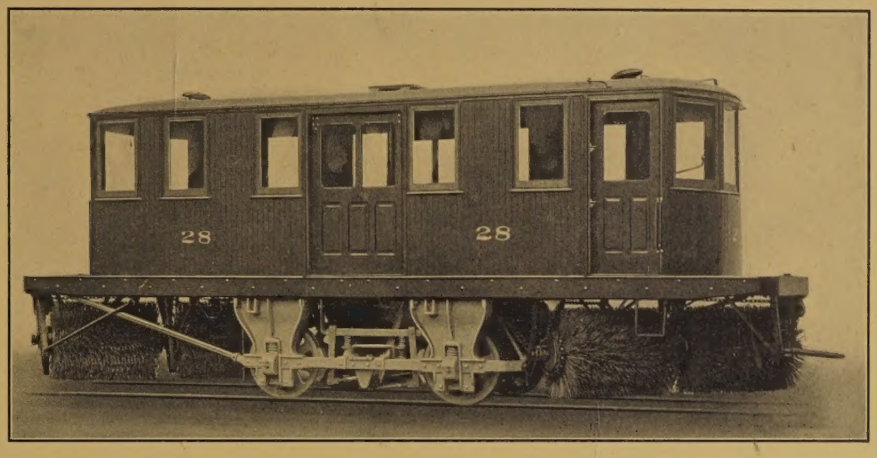
**Albert J. Kelting, Brooklyn, N. Y.,** has issued a sixteen-page catalog in which Kelting positive pressure blowers, vacuum pumps and exhausters are described and illustrated.

**General Electric Company, Schenectady, N. Y.,** has issued a poster which illustrates the various sizes and types of GE Edison Mazda lamps. The actual sizes of the lamps are reproduced. The poster is 28 in. x 43½ in. and is printed in colors.

**Watson-Stillman Company, New York, N. Y.,** has issued Catalog No. 87, which describes and illustrates the new Watson-Stillman hydraulic coupler yoke shearing and riveting press. This machine shears riveted coupler yokes from their couplers or clamps and rivets the couplers and yokes together with a single stroke of the ram.

**Lidgerwood Manufacturing Company, New York, N. Y.,** has issued a seventy-eight-page catalog which fully describes and illustrates Lidgerwood derricks, derrick fittings and derrick engines. The catalog contains many illustrations showing the installation of the company's apparatus. Another catalog issued by the company describes and illustrates Lidgerwood rapid unloaders for discharging dirt, ballast, rock or ore.

BRILL CITY AND INTERURBAN CARS AND TRUCKS BRILL

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YOU may not need snow sweepers very often on your line—but when you do need them you want to run them out—quick. Brill Sweepers (and plows) can always be relied upon for immediate service. The mechanism is simplicity itself, so that in the infrequent event of repairs becoming necessary, they can readily be made. The broom shafts are carried by heavy steel brackets and the shaft journal box arrangement makes tilting or jamming impossible. The carrier brackets are securely bolted through the car sills, which are re-inforced by heavy sill plates and firmly braced at the lower ends. The hand wheels for raising and lowering the brooms are so located that the operator always has a clear view of the track. Chain and sprocket gearing from a motor-driven shaft operates the brooms.

There are two standard types of Brill Standard Snow Sweepers—long and short broom. The plows are made in 9 standard types. Special types designed and built or built to your own specifications. You probably know all about the Brill Track Scraper.

Better get the Brill Snow Fighting Equipment catalog.

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**AMERICAN CAR COMPANY**
**St. Louis, Mo.**

**JOHN STEPHENSON COMPANY**
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**G. C. KUHLMAN COMPANY**
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**WASON MANUFACTURING COMPANY**
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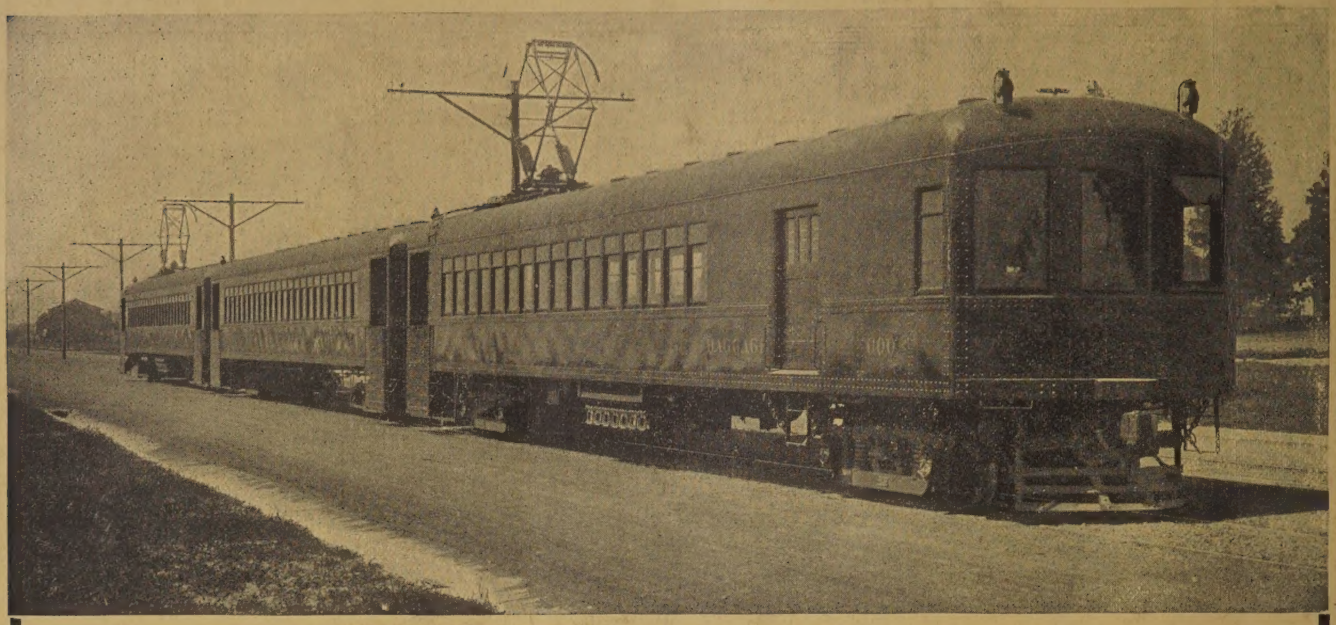

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Ft. Dodge, Des Moines & Southern Railway
Oregon Electric Railway Co.
Southwestern Traction & Power Co.
Indianapolis, Columbus & Southern Traction Co.
Southern Cambria Railway Co.
Aroostook Valley Railway Co.
Washington, Baltimore & Annapolis Electric Railway.
Southern Pacific Railroad
Milwaukee Electric Railway & Light Co.
Nashville & Gallatin Railway
Kansas City, Clay County & St. Joe Electric Railway
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Youngstown, Ohio

3325